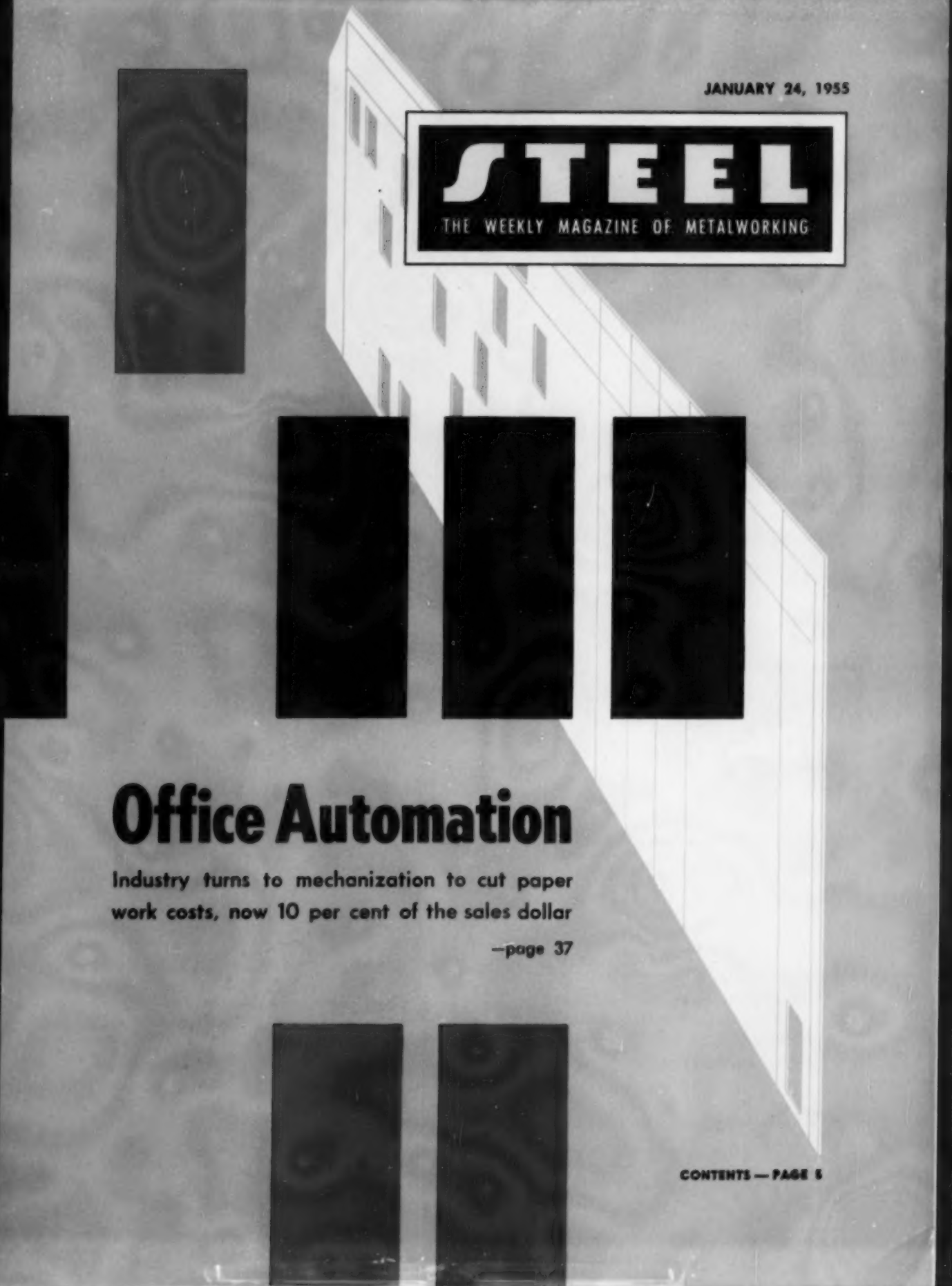
JANUARY 24, 1955

STEEL
THE WEEKLY MAGAZINE OF METALWORKING



Office Automation

Industry turns to mechanization to cut paper work costs, now 10 per cent of the sales dollar

—page 37

CONTENTS — PAGE 5

WEIGHS 20% LESS

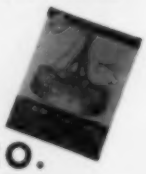
COMPARABLE LIFTING CAPACITY

DISCHARGES LOADS QUICKER

NEW 45" MAGNET PROVIDES FASTER OPERATION OVER A WIDER WORKING RADIUS

This new magnet, developed by EC&M engineers, is the lightest weight magnet in the 45-inch size. High strength and watertight construction is maintained with a completely ALL-WELDED design. Elimination of bolt-head recesses allows a better proportion for coil space, giving high lifting capacity. Welding keeps pole shoes tight too. Get the facts on this new EC&M type LSW magnet. Operators like the faster maneuverability . . . greater working radius, which permits more trips per day. The EC&M complete line of magnets includes 14 sizes, from 12-inches to 80-inches in diameter (the world's largest).

Write for Bulletin 900-L



THE ELECTRIC CONTROLLER & MFG. CO.

2698 East 79th Street • Cleveland 4, Ohio

He's giving the roll a facial

Let's look in for a moment on Hugh, roll grinder at our Sparrows Point sheet mill. Here he is, in characteristic position: eye glued to the roll as it turns against the abrasive wheel.

Hugh has nothing to do with actual production, but his job is vital to the ultimate quality of the sheets. The surface of a finished sheet can be no better than the surface that rolls it. For if any little imperfection, however slight, were present on the surface of the roll, it would automatically be impressed on the sheet streaming through the mill. Result: an off-product.

Small wonder Hugh is so wrapped up in his work. For he, like the men he works with, is shooting all the time for 100 per cent quality production. Only quality, as he well knows, keeps customers happy, orders on the books, men on the job. It's up to Hugh to grind away each little blemish on the roll. It's up to him to check the hardness and the crown. Above all, he must carefully gage tolerances to be sure the roll will be precisely right for the job it has to do.

Hugh's conscientious attitude is enthusiastically shared by the other men in our Sparrows Point and Lackawanna sheet mills. Each man knows that he is part of a highly expert team. That team is out to win. The goal: to produce the best hot-rolled and cold-rolled sheets made anywhere.

How are they doing? Well, anyone can claim the best, of course, but self-praise is unbecoming. So we'll just say this: our sheet mills at Sparrows Point and Lackawanna are turning out sheets that at the very least will stack up favorably with the best the industry is making. Sheets as finely finished, as easy forming, as true to gage as any on the market. Sheets as fine as you can buy!

BETHLEHEM STEEL COMPANY
BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. Export Distributor: Bethlehem Steel Export Corporation

BETHLEHEM STEEL

BETHLEHEM SHEETS

MORE THAN 300 LEADING MANUFACTURERS

are already putting

SKF TYPE "C" BEARINGS

in their products

Here are the trade marks of a few of more than 300 leading manufacturers – companies who want extra bearing performance – who already are using the *improved* SKF Type "C" Spherical Roller Bearing announced less than a year ago.

There are two reasons why

First: They know that for over 40 years, SKF has been *first* with anti-friction developments that *work*.

Second: They obtain, size for size, up to 50% more capacity, 2 to 3½ times increased life with SKF's Type "C" Spherical than they can obtain with any other available design, and at no increase in cost.

7550

SKF INDUSTRIES, INC., PHILADELPHIA 32, PA
– *manufacturers of* **SKF** *and* HESS-BRIGHT® *bearings.*

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SKF®

BALL AND ROLLER BEARINGS

How many push-ups in a STAINLESS TUBE?

Courtesy: American District Steam Co., Inc.

The service life of this corrugated element depends on its ability to do push-ups.

Hydraulically formed from a welded stainless steel tube, it's a vital part in a Corruflex pipe expansion joint. In operation it absorbs the motion that results from pipe expansion and contraction. Often used in inaccessible locations, it's produced to rigid standards to eliminate shutdowns . . . loss of manhours . . . and maintenance costs.

In a recent durability test (see photo) the joint was subjected to 22,000 push-ups . . . 22,000 complete cycles of extension and compression —without failing. Flexing was stopped only because requirements had been met. Trouble-free tubing for this grueling application is regularly furnished by Frasse — in stainless types 304, 316 and 347—in sizes from 4¼" O.D. up to 54¾" O.D. !

Frasse specializes in furnishing *quality* tubing for exacting applications — and stocks in conveniently located warehouses a complete range of sizes in carbon, alloy and stainless analyses for you to work with. And, equally important, Frasse engineers will gladly work with you in determining the right size and grade needed to do the job. When you need tubing or tubing guidance—*always call Frasse.*

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If you use tubing . . .

Send for this new folder describing *all* Frasse tubular products. Details include analyses, size ranges, mechanical and physical properties—also fabricating hints and ideas for end uses. Frasse tubing "specials" are included too! Mail the coupon for your copy—it's free!

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B Heavy, single-layer fabric reinforcement for strength with flexibility
C Tough, wear- and weather-resistant cover

Cheapest Way to Give a Catalyst Nine Lives—or More!

COSTLY vacuum cleaning operation for a Western oil refinery was sucking hot catalyst from the regenerator of their fluid cracking unit. First flexible metal tubing, then steel pipe was used to conduct the extremely abrasive particles to the storage tank under 18" vacuum. But the tubing pulled apart in as little as *two minutes*. The pipe failed in only *48* hours.

The G.T.M.—Goodyear Technical Man—recommended a special dry materials hose with a highly heat- and abrasion-resistant tube and full-faced, built-in flanges. At last report, this designed-to-the-job hose had served a total of *144 hours* and looked good for much more.

Hose is a specialty of the G.T.M. He has over 800 types in actual production—hundreds more under development—all designed to lower your hose costs. You can benefit from his experience by contacting your Goodyear Distributor or Goodyear, Industrial Products Division, Akron 16, Ohio.

YOUR GOODYEAR DISTRIBUTOR *can quickly supply you with Hose, Flat Belts, V-Belts, Packing or Rolls. Look for him in the yellow pages of your Telephone Directory under "Rubber Products" or "Rubber Goods."*

SPECIAL DRY MATERIALS HOSE by

GOODYEAR

THE GREATEST NAME IN RUBBER

This Week in Metalworking

STEEL
THE WEEKLY MAGAZINE OF METALWORKING
Vol. 136 No. 4 January 24, 1955

√NEWS √PRODUCTION-ENGINEERING √MARKETS

Metalworking Outlook ... 31
The Editor's Views ... 35
Office Automation ... 37
Equipment and techniques are available to pare down 10-per-cent slice paper work chisels from sales dollars
Butterworth Bucks a Trend ... 45
A textile machinery maker successfully uses contract manufacturing to level out peaks and valleys
Windows of Washington ... 46
Management at Work ... 49
Magcoa's McDonald: Promoter of impact extrusion
Growth in Mexico ... 50
Metalworking gains a toehold south of the border
Rising Pay Scale for Executives ... 51
Survey shows 23.5 per cent average increase in pay
Mirrors of Motordom ... 53
The Business Trend ... 57
Men of Industry ... 61

Technical Outlook ... 69
Water Hardening Types: Part I ... 70
No. 12 in the Modern Heat Treating Series discusses developing needed properties for tools by water hardening
Give Corrosion a Run for Your Money ... 74
Zirconium might help you solve your corrosion problems. Cost is high, but only small quantities are needed
Progress in Steelmaking ... 76
Stainless Specialty Shop Highlights Trend — Rotary Electric has gone into the business. Here's how it's done
Hot Spray Smooths Out Rejects ... 82
Using hot spray finishing, a manufacturer of home freezers was able to up production, lower costs
Right Container Keeps Parts on Schedule ... 90
Built-in handling resources, ability to plan their use speed multiproduct processing. Operations are "unitized"
New Products and Equipment ... 93

The Market Outlook ... 99
Metal Prices and Composites begin on Page 100
Nonferrous Metals ... 102

Behind the Scenes ... 6
Letters to the Editors ... 10
Helpful Literature ... 97
Calendar of Meetings ... 27
Obituaries ... 64

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THE PLACE TO SOLVE YOUR BOLT PROBLEMS
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"The Bolt Man"

behind the scenes

Popularity's Price

Over the long haul Jim Zuber, STEEL's Business Manager, probably had more to do with advertising this magazine's reputation than any other man. His efforts in this connection have been so successful that it's difficult to find an executive in the metalworking business who doesn't regard STEEL with interest and respect. Many persons accept it as the final and complete authority in the field it serves, an attitude that sometimes disturbs Mr. Zuber because of the heavy responsibilities such a reputation involves. Recently a man who aimed to establish a metal fastener business put the question right to us: How many manufacturing companies use metal fasteners? Where are these plants located? Do they use a lot of fasteners? Information gleaned from answers to these questions, said the crafty fellow, would reveal his market and suggest the location of his factory.

Where Metals Went

Other and equally disarming questions send STEEL editors scurrying to their files. Correspondents want to know how much tin was used in Arkansas in 1946, or how much aluminum was consumed last year in Nevada. To shed light on these and similar queries, Assistant Managing Editor Vance Bell masterminded a report on geographic consumption of ferrous and nonferrous metals. He divided this report into four parts, the first of which appeared in the Jan. 17 issue. Vance trots out maps and statistics showing how states and sections of the U. S. rank as consumers of carbon steel, alloy and stainless steel, copper and copper-base alloys and aluminum. He based his findings on a Government study, the latest in five years, and translated tons into percentages for quicker comprehension.

So, if you are curious about the geographic consumption of these important metals, just ask for reprints of the articles.

The Admirable Gillies

Republic Steel Corporation rejoices in the employment of perhaps the oldest active mining prospector in the country. Donald B. Gillies, who looks upon septuagenarians as mere whipper-snappers, has never for an instant relaxed his profound interest in the earth's crust. During his long and tremendously fascinating career he has very likely tapped more rocks and crawled through more miles of tunnels than any other living man. He was one of the leading spirits associated with the recent exploration and development of the vast Mexican deposits of rutile, the ore from which titanium is refined. (STEEL, Dec. 27, 1954) Following a Republic Steel junket to the mine fields, a group of business correspondents met at Pluma Hidalgo and respectfully presented Mr. Gillies with a loving cup Almost as old as the Mexican pyramids, the cup had a handle, and had been designed for—well, let us say strictly utilitarian purposes. The correspondents called themselves the Mole Men of Pluma Hidalgo, and included: Brice Armstrong (AP), Robert Cochran (Business Week), Watson Davis (Scripps Science Service), Juan Guzman (Republic photographer), Robert Seltzer (Financial Editor, Cleveland Press), Bill Stapleton (Colliers), Irwin Such (Editor, STEEL), and E. S. Bowerfind (Director Public Relations, Republic Steel).

Mr. Gillies, not to be outdone either in courtesy or cleverness, wrote a personal note to the Mole Men, thanking them for their affectionate gesture, and also for the privilege of being considered one of their group. He concluded by writing:

"I have not yet acquired the art of smoking, but when time catches up with me, which is not far away, I have decided to learn how to smoke for the simple reason of fulfilling what is expressed in the following lines:

Folks think I'm alone as I sit in my chair
And the rich mellow smoke floats off in the air,
But there's always some friend, whom the others can't see
Comes out of that smoke and visits with me.

Sincerely yours,
Donald B. Gillies.

Shrdlu

(Metalworking Outlook—Page 31)

a practical approach to pressroom modernization

Announcing

TWO NEW Verson PLANS

to solve press obsolescence problems

The extensive capital expenditures required to meet competitive pressures have put many manufacturers in an unfortunate position. Modernization is necessary if the manufacturer is to price his product competitively and still make a fair profit. However, the fair profit is necessary before he can afford the modernization. Two new Verson plans make it possible to modernize now and pay for it out of the increased profits it provides. If you are one of the manufacturers faced with the dilemma of needing modernization for better profits, but needing better profits before you can afford modernization, one of these plans may be the answer to your problems.

Customized

INSTALLMENT PROGRAM

For the manufacturer who wishes to own his own presses but minimize his initial capital outlay, Verson offers a Customized Installment Program. It is called "Customized" because the payment plan is tailored to the buyer's own financial requirements rather than to a single fixed plan. Initial payments may be as low as 10 per cent of the purchase price with the balance payable over periods ranging from six months to five years. Further information on a plan to meet your needs will be furnished on request. Please outline your requirements.

Customized

LEASING PROGRAM

For the manufacturer who wants the advantages of modern, efficient presses without capital investment, Verson offers a Customized Leasing Program. Like the Installment Program, a choice of plans is available to best suit the buyer's requirements. In addition to the basic plans, options for continuation, termination and eventual purchase are also available. Special arrangements for special machines will be considered. Further information on a leasing plan to suit your needs will be furnished on request. Please outline your requirements.

A Verson Press for every job from 60 tons up.

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This rear axle assembly must withstand shock and vibration at high speeds. Republic "Nylok" Nuts are used to assure positive locking even under severe vibration. The nylon plug in one face forces the nut tight against the opposite threads of the stud as the nut is turned on.

Republic "Nylok" Nuts lock whether seated or not. They go on easily. Either end is up. Feed them automatically at full production speed. Or manually for piece-work. No special tools, lubricants or techniques are needed.

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Baked-enamel applied to Republic Electro Paintlok gives this bakery goods display a customer-attracting appearance and longer service life. These zinc-plated steel sheets are chemically treated to take paints, lacquers, synthetic enamels—and hold them for years. If you paint on steel, consider Electro Paintlok for making your fabricated steel products more attractive, more serviceable, at less cost.

Revenue increased 15% to 40% when these rental lockers were made from Republic ENDURO Stainless Steel. Yet, costs were only 9% more than for carbon steel, painted. ENDURO's bright, attractive finish generates "sell". No other material offers the designer so many advantages. Republic makes ENDURO in all commercial forms. Republic metallurgists will help you apply its bonus benefits to your product or process.

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World's Widest Range of Standard

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Assemble from either end • Can be re-used • Non-galling • Best wrenching characteristics • One-piece • Cold-forged • Won't damage threads • No special tools • Lock in any position • No special know-how • No lubricants needed • Ideal for mechanical feeding

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Write for a sample indicating size required.

"Nylok" *Nuts are only one of more than 20,000 types and styles of high quality fasteners made by Republic for all industries.

*U. S. Pat. No. 2,462,603 and No. 2,430,694 and pending applications.

These gears were made at less cost from Republic Cold Drawn Special Sections. Much of the machining was eliminated because the sections already were formed to the predominating cross-section of the part. Parts benefit from the increased physicals produced by cold drawing. The bright smooth finish rarely requires further machining. Send samples or blueprints of your parts. We will tell you whether you can save money—and how much—by making your steel parts from Republic Special Sections.

REPUBLIC STEEL CORPORATION
3120 East 45th Street,
Cleveland 27, Ohio

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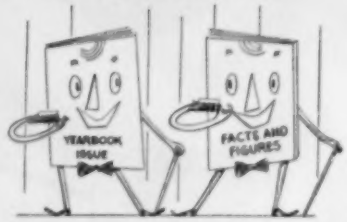
LETTERS
TO THE EDITORS

Introducing the New Year



Please send us a copy of STEEL's Metalworking Yearbook issue, Jan. 3, 1955.

J. P. Wilson
Tractor & Implement Division
Ford Motor Co.
Birmingham, Mich.

Please send to my attention 50 copies of the "1955 Metalworking Facts & Figures" from the Jan. 3 issue of STEEL.

Marion Burton
Denison Engineering Co.
Columbus, O.

We would like one copy of the Yearbook issue . . .

Edmund A. Freeman
Association of American Railroads
Washington

Please send a copy of the Yearbook.

A. H. Good
assistant vice president
Metropolitan Life Insurance Co.
New York

We would appreciate a reprint of the "1955 Metalworking Facts & Figures" . . .

H. L. Willson
purchasing agent
Viking Pump Co.
Cedar Falls, Iowa

Makes Electronic Tester

I would like to get in touch with the company which manufactures the electronic testing equipment described in the article on p. 72, Dec. 27 issue. (Developed by Cecil Farrow, one of Republic Steel's electrical engineers, the device can spot tiny holes, defects or irregularities in either welds or adjacent walls as tubes are passed through.)

R. M. Reichl
R. M. Reichl Co.
Forest Hills, N. Y.

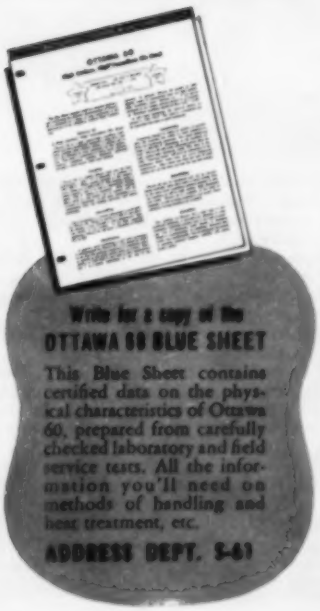
• *Republic Steel Corp. is not marketing the device, but Republic does have a licensing agreement with Sperry Products Inc., Hoboken, N. J. Inquiries should be directed to the latter source. —ED.*

Dryer Sales Going Up

We have read your article, "Appliance Sales in '55: No Cause for Tears" (Dec. 20, p. 41). It appears that your unit figures on automatic dryers for 1953 are comparatively correct (696,468), but the estimate for 1954 and the prediction for 1955 both are unusually low (1954: 625,000; 1955: 700,000).

The industry has far passed the 1954

(Please turn to page 12)


Write for a copy of the
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This Blue Sheet contains certified data on the physical characteristics of Ottawa 60, prepared from carefully checked laboratory and field service tests. All the information you'll need on methods of handling and heat treatment, etc.
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OTTAWA 60 is a *new* die steel, an A-L "original," developed primarily to deep draw and form stainless steel. As intended, it performs without galling or pickup and shows exceptional wear resistance in that service. We have plenty of case histories to show you in proof.

But *wherever* you use Ottawa 60 draw dies—not just on stainless steel—this high-carbon, high-vanadium alloy comes through for you. Illustrated above are the first and second draws on transformer housings, produced from .037" gauge SAE 1010 strip. The company formerly used dies made of 5% chrome air-hardening die steel—and later a more highly alloyed material—without ever getting more than about 2000 pieces before the dies began to show gall marks and pickup, and parts were rejected due to scoring, breakage and oversize. *Dies made from Ottawa 60 forgings cured that! Results after 25,000 pieces showed no pickup and no wear on punch or die.*

● You can solve many a problem and save real money with Ottawa 60 draw dies! Write for information or call in our Field Service Staff to help you get started. ***Allegheny Ludlum Steel Corporation, Oliver Bulding, Pittsburgh 22, Pa.***

For complete **MODERN** Tooling, call

Allegheny Ludlum

WSD 5463

AL FINE TOOL STEELS SINCE 1854

Five-Year Record of PRODUCTIVITY in

North Carolina

Convincing evidence of North Carolina's advantages for industry, with a good indication of the workers' abilities in the metalworking field, is summarized in this statement contained in the 1953 Annual Report of SACO-LOWELL SHOPS, about its plant in this State:

"By all measures of performance the acquisition of this plant in 1948 has been completely justified; it has met every requirement established both for the quantity and the quality of its production."

The growth of this North Carolina plant is described in these words:

"The first textile machine to be made in Sanford was the Comber, manufacture of which was commenced late in 1948. In the next year the production of lap winders, continuous strippers, and sliver testers was allocated to Sanford, and the number of employees increased to 270. The production of these four machines was so satisfactory that in 1950 the manufacture of drawing frames was transferred to this plant and an addition of 16,600 square feet was built to take care of the increased volume of business."

Other companies, too—big names and new names—have chosen North Carolina for the many reasons which have made it the South's leading industrial State.

For specific information or a copy of the general industrial brochure, just write, wire or phone Ben E. Douglas, Director, Department of Conservation and Development, Raleigh 10, N. C.

The 48-page booklet "NORTH CAROLINA STORY" describes the State's industrial diversity in a chapter "From Aircraft to Zippers". Write for a copy.

Friendly North Carolina Where Industry Prospers

LETTERS

(Concluded from page 10)

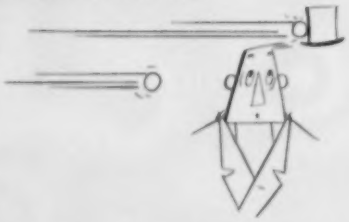
figure you listed this year (625,000 units), and we would estimate that the total for the year will be about 850,000 to 860,000. The industry's prediction for 1955 is about 1 million units.

Our purpose in writing is to attempt to ascertain where you received the erroneous information about the 1954 production.

R. G. Halvorsen
vice president
Hamilton Mfg. Co.
Two Rivers, Wis.

• *You're right, the estimates for 1954 and 1955 are low. The automatic dryer sales figures shown in the chart for 1954 and 1955 refer to electric units only. We inadvertently omitted figures on gas units—ED.*

Series Makes a Hit



Please send me a complete set of STEEL's 1954 Program for Management series, as follows: "Now You Have To Sell," "Build Better Bosses," "Automation: How Far Should You Go?" "Stabilizing Production and Employment," "Integrate Your Distribution," "Personnel in Distribution," "Transportation in Distribution," "Product Diversification," "Foremen: Bridge to More Efficiency," and "Product Design."

Paul F. Buckler
Electronics Department
Westinghouse Electric Corp.
Philadelphia

I would appreciate two copies of each of the ten articles in the 1954 series . . .

Carl Claus
executive assistant
Babcock & Wilcox Co.
Refractories Division
New York

• *Sent.—ED.*

Reversed Conversion Chart

By now you've undoubtedly had the sad news. The scale titles on the hardness conversion chart (Jan. 10, p. 70) were reversed.

Though I'm sorry to have had this happen, I certainly understand. Errors of this type are not pleasant, but they are certainly inevitable when you handle (and have artists and printers handle) detailed presentations of data.

I hope this letter will spare your staff the shock of reading the chart and finding a steel that should be martensite with a tensile of 3000 (sic) psi.

Bruce Fader
5615 N. Wayne Ave.
Chicago

• *A corrected key was printed on p. 96 of the Jan. 17 issue. Corrected reprints of the chart are available from STEEL's Readers Service Department.—ED.*

"Yoloy E sheets - ideal for truck bodies..."

says Boyertown Auto Body Works of Boyertown, Pennsylvania

Body Model S-7, with load capacity of 187 cu. ft. Boyertown Auto Body Works, Boyertown, Pa.

THE YOLOY FAMILY

High in resistance to corrosion, shock and vibration, easy to fabricate, easy to weld.

YOLOY
(Nickel-Copper)
Low Alloy High Strength Steel

YOLOY E
(Nickel-Chrome-Copper)
Low Alloy High Strength Steel

YOLOY C
(Chrome-Copper)
Corrosion Resistant Steel

YOLOY IS AVAILABLE in sheets, plates, strip, pipe, mechanical tubing, bars, shapes and cold finished bars.

Boyertown truck bodies, such as Model S-7 shown above, are serviceable for many EXTRA YEARS, because they are fabricated from Yoloy "E" sheets.

Due to its nickel-chrome-copper content, this tough corrosion-resistant, low-alloy high strength steel reduces dead weight, resists corrosion and lengthens body life. Yoloy "E" is also outstanding for its resistance to vibration and shock—even at the lowest outdoor temperatures.

For types of Yoloy available for prompt delivery, phone our nearest District Sales Office.

Youngstown

QUALITY YOUNGSTOWN SERVICE

THE YOUNGSTOWN SHEET AND TUBE COMPANY *Manufacturers of Carbon, Alloy and Yoloy Steel*

General Offices: Youngstown, Ohio - Export Office: 500 Fifth Avenue, New York 36, N. Y.

SHEETS - STRIP - PLATES - STANDARD PIPE - LINE PIPE - OIL COUNTRY TUBULAR GOODS - CONDUIT AND EMT - MECHANICAL TUBING - COLD FINISHED BARS - HOT ROLLED BARS - BAR SHAPES - WIRE - HOT ROLLED RODS - COKE TIN PLATE - ELECTROLYTIC TIN PLATE - RAILROAD TRACK SPIKES

Is that sales call worth $17.00?

$$$$$$$$$$$$

Today STEEL helps you do two jobs that provide the answer to that question

Seventeen dollars is the price industry pays today for the average sales call. When you're buying calls at this price, you've got two problems:

1. To guide your salesmen to the kind of prospect who represents potential volume sufficient to make $17.00 sales calls pay off.
2. To boost your salesmen's productivity by *preconditioning* the market in advance of salesmen's calls.

To help you solve both, STEEL continues to gear its publishing and circulation programs to the needs of the world's largest industrial market.

That's why, through the pages of STEEL, you reach more U. S. metalworking plants with the most industrial buying power.

Moreover, you back your salesmen's efforts by talking to the "influential four" in metalworking . . . the key management, production, engineering and purchasing executives who say "Yes" or "No" to the order.

Isn't *this* the kind of help you want and need today to put action *into* and pull returns *out of* those $17.00 sales calls?

Talk to the man from STEEL. He has market facts and figures, and other sales direction aids you'll be interested in. STEEL, Penton Building, Cleveland 13, Ohio.

PUT THE STRENGTH OF STEEL
INTO YOUR ADVERTISING PROGRAM

IF YOU ARE OVER 45 and your wife keeps insisting that you should have *two* chest x-rays every year... don't blame her. *Thank* her! Semi-annual chest x-rays are the best "insurance" you can have against death from lung cancer.

The cold fact is that lung cancer has increased so alarmingly that today you are six times more likely to develop lung cancer than a man of your age 20 years ago. Our doctors know that their chances of saving your life could be as much as ten times greater if they could only detect lung cancer before it "talks"... before you notice any symptom in yourself. That's why we urge you to make semi-annual chest x-rays a habit—for *life*.

To see our new life-saving film "The Warning Shadow" call the American Cancer Society office nearest you or simply write to "Cancer" in care of your local Post Office.

American Cancer Society

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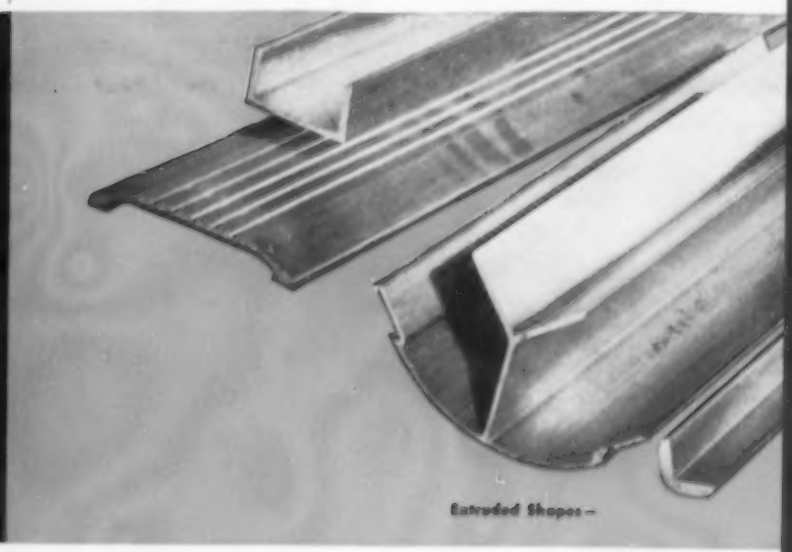
Built-up parts are no bargain; riveting and welding demand too many costly man-hours.

That's why production costs drop when you use aluminum extruded shapes. They take the handcuffs off your designer and allow him to distribute the metal where it's needed. Parts that would be prohibitively expensive to produce by assembly become practical. And while extrusion is not a precision process, tolerances are so close that only surface finishing is ordinarily required. Lengths run to 80 feet, maximum weights up to 600 pounds per piece.

Alcoa operates the world's largest light metal extrusion facilities with 50 presses in five plants. With the experience of 50 years to draw on, Alcoa can show you how to take advantage of a broad line of standard extruded shapes or help you design for your own specialized requirements.

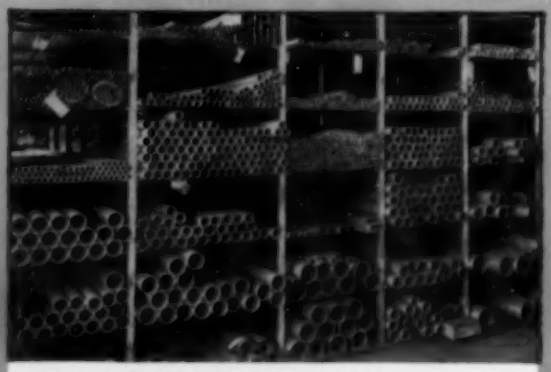
Alcoa Extruded Shapes

Can put the metal where you want it without time-consuming, costly assembly.

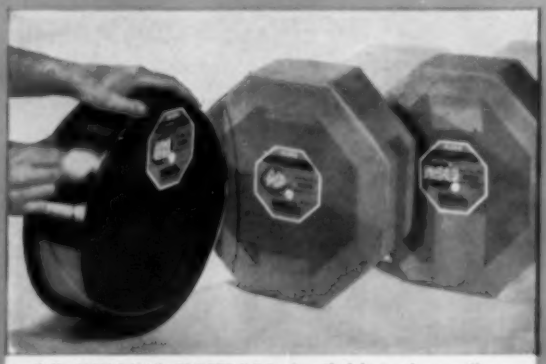


Products of Sixty-Six Years of Pioneering in Aluminum

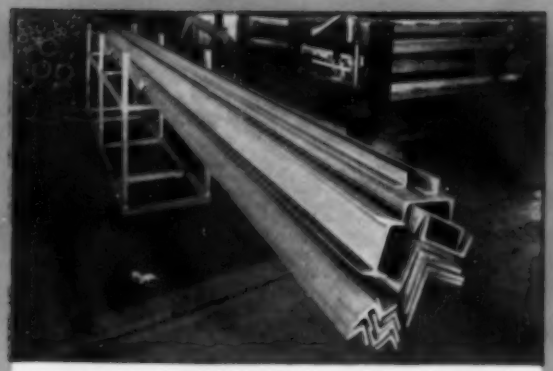
EXTRUDED SHAPES: For thresholds; window sills; door frames; glass stops; copings; gravel stops; trim; truck bodies. Also angles; channels; tees; zees; etc., for structures.



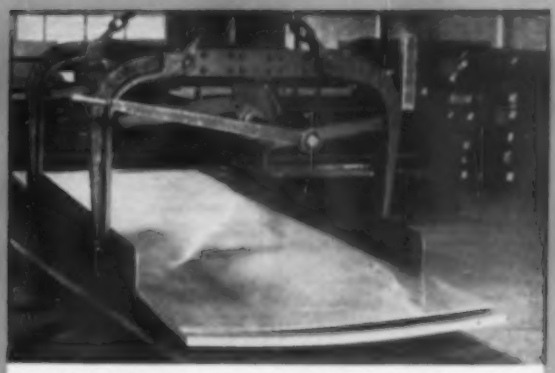
TUBE AND PIPE: Coiled tube; Alcoa® Utilitube; straight tube in round, square and rectangular shapes; heat exchanger tubes; standard pipe and pipe fittings; construction pipe; rigid conduit.



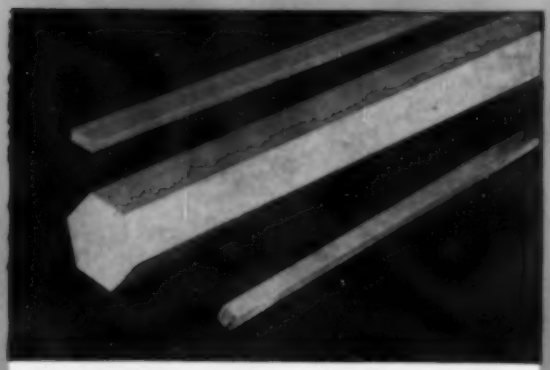
I.G. WELDING ELECTRODE: Available in three alloys and in six diameters. It is level wound on expendable spools in continuous lengths.



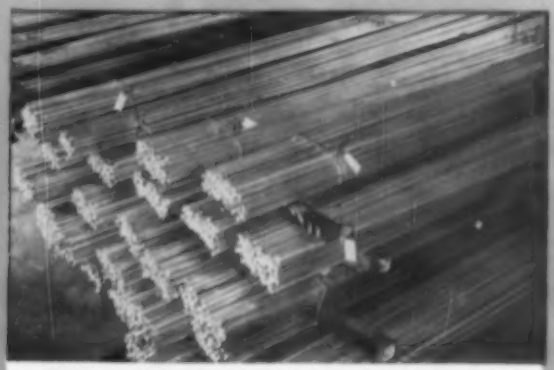
ROLLED SHAPES: Equal angles; unequal angles; channels; I-beams; tees; zees. Suited to a variety of structural applications.



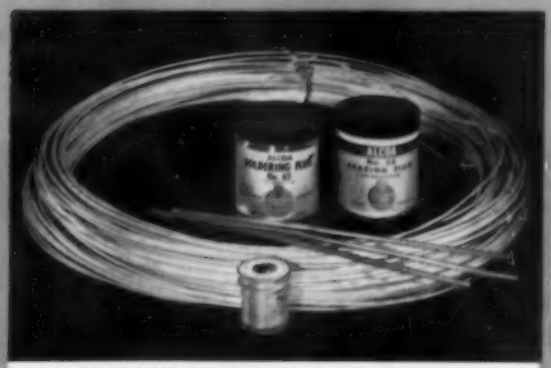
SHEET AND PLATE: Flat and coiled sheet; circles; patterned sheet; plate; tread plate; roofing and siding sheet; roofing accessories and fasteners; specialty sheet.



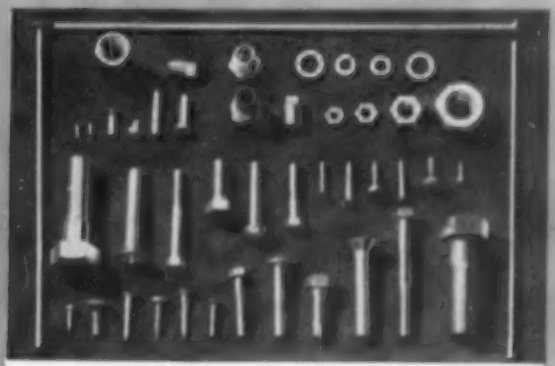
BAR STOCK: Square, hexagonal and rectangular in all commercial alloys. Rolled and cold finished to final dimensions for superior tolerance and finish.



SCREW MACHINE STOCK: Available in 2011-T3 (formerly 11S-T3), the free-machining alloy, and 2017-T4 (formerly 17S-T4), a higher strength alloy, plus 2024, 6061 and 7075 (formerly 24S, 61S and 75S).



WELDING AND SOLDERING: Welding and brazing wire; welding and brazing flux; solder flux; solder.



FASTENERS: Machine screws, wood screws; washers; nuts; bolts; rivets. Recommended for fastening aluminum to prevent electrolytic damage.

Your Alcoa Distributor has Alcoa Standard Warehouse items in stock

Your Alcoa Distributor is as near as your telephone and his warehouse is stocked with the aluminum products you need for fast, economical production. His facilities include modern equipment for sawing, shearing and slitting stock to your specifications and for making prompt deliveries.

LOOK FOR HIS NAME HERE:

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Birmingham
*Hinkle Supply Company
CALIFORNIA
Los Angeles
*Ducommun Metals & Supply Co.
Pacific Metals Company, Ltd.
San Diego
Ducommun Metals & Supply Co.
San Francisco
*Pacific Metals Company, Ltd.
COLORADO
Denver
Marsh Steel Corporation
Metal Goods Corporation
CONNECTICUT
Milford
*Edgcomb Steel of New England, Inc.
FLORIDA
Jacksonville
Florida Metals, Inc.
Miami
Florida Metals, Inc.
Tampa
*Florida Metals, Inc.
GEORGIA
Atlanta
*J. M. Tull Metal & Supply Co., Inc.
IDAHO
Boise
Pacific Metal Company
ILLINOIS
Chicago
*Central Steel & Wire Company
Corey Steel Company
*Steel Sales Corporation
INDIANA
Indianapolis
Steel Sales Company of Indiana, Inc.
KENTUCKY
Louisville
Williams & Company, Inc.
LOUISIANA
New Orleans
Metal Goods Corporation
MARYLAND
Baltimore
Whitehead Metal Products Co., Inc.
MASSACHUSETTS
Cambridge
Whitehead Metal Products Co., Inc.
MICHIGAN
Detroit
Central Steel & Wire Company
Steel Sales Company of Michigan
MINNESOTA
Minneapolis
Steel Sales Company of Minnesota
MISSOURI
Kansas City, North
*Marsh Steel Corporation
Metal Goods Corporation
St. Louis
*Metal Goods Corporation
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Nashua
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NEW JERSEY
Harrison
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NEW YORK
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TEXAS
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Metal Goods Corporation
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see our catalog in PLANT ENGINEERING FILE or write for copy

TWO NEW "HOW-TO-DO-IT" FILMS

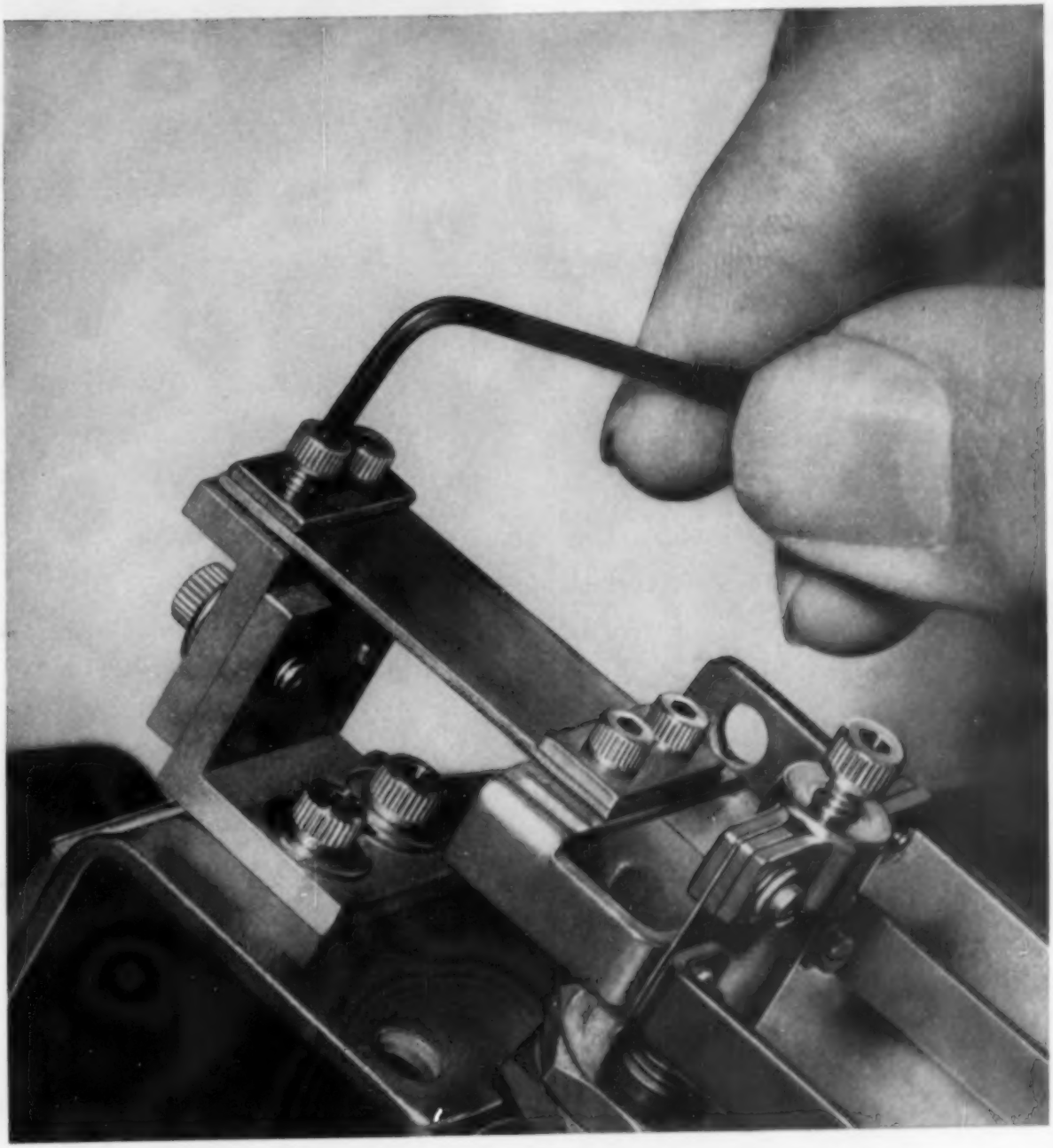
New Horizons in Aluminum Brazing and *Welding Advances with Aluminum*. Both 16 mm with sound and full color. Your distributor will arrange bookings. Ask him now!

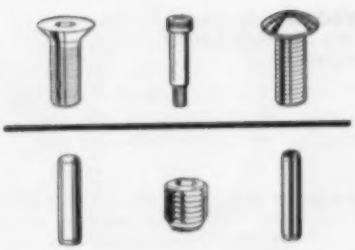
Your local Alcoa sales office is a ready source for counsel on special applications of aluminum. You'll find the number in the yellow pages of your classified telephone directory. Or write: ALUMINUM COMPANY OF AMERICA, 876-A Alcoa Building, Pittsburgh 19, Pennsylvania.

ALCOA ALUMINUM

ALUMINUM COMPANY OF AMERICA

UNBRAKO AT WORK





MINIATURIZATION. Small socket cap screws make possible smaller instruments. UNBRAKO Micro Socket Cap Screws range in size from #0 to #3, from ⅛" to ½" in length. But they have much more than microsize to recommend them. They are so strong that three UNBRAKOS will do the job of five ordinary cap screws. Or, if you must use the same number of screws, you can safely use smaller UNBRAKOS. All UNBRAKOS have knurled heads for easier handling and faster assembly, and uniform sockets for maximum wrench engagement. Your favorite industrial distributor always stocks UNBRAKOS. STANDARD PRESSED STEEL CO., Jenkintown 33, Pa.

UNBRAKO® SOCKET SCREW DIVISION SPS JENKINTOWN, PENNSYLVANIA

CUT COSTS *of snagging and surfacing*

● **NEW RESIN SANDER DISCS** are easily identified by their green back...come in a range of sizes and types to fit all Disc Sanders, in 16 through 150 grit.

● **YOUR CARBORUNDUM DISTRIBUTOR** or salesman offers prompt delivery from complete stocks. For a FREE DEMONSTRATION in your shop, phone him today...he's listed in the yellow pages of your phone book under "Abrasives" or "Grinding Wheels." Or write The Carborundum Company, Dept. S 82-52, Niagara Falls, New York. In Canada: Canadian Carborundum Company, Ltd., Niagara Falls, Ontario.

three ways...with **RESIN SANDER DISCS**

1 FASTER CUTTING. CARBORUNDUM's Resin Sander Discs are engineered to handle your toughest grinding jobs, such as reducing heavy-scale encrusted welds. The sharp, top-quality aluminum oxide abrasive grain bites into metal fast...stays uniformly sharp from start to finish.

2 LONGER LASTING. Because of the special resin bond with greater holding power, plus a rugged all-fibre backing, Resin Sander Discs resist both edge-wear and the heat of flat contact grinding. You get more work from each disc—which soon adds up to impressive savings.

3 NEW DOUBLE-PROTECTION PACKAGE. Resin Sander Discs are doubly protected from moisture and handling. Packed first in moisture-resistant bags, then in sturdy outer cartons, they reach you factory-fresh—stay that way till you are ready to use them.

GET THESE ADVANTAGES

...and many more, by using Resin Sander Discs on *your* next job.

CARBORUNDUM

REGISTERED TRADE MARK

...continually putting more **SENSE** *in your abrasive* **DOLLAR**

Seven years service for STANOIL *Industrial Oil at David Bradley Mfg. Works —No down time for lubrication*

L. R. Cummings (left), Standard lubrication specialist, inspects sample of STANOIL, with Robert C. Menken, Plant Engineer of David Bradley Manufacturing Works. Larry Cummings has been serving industrial customers for Standard Oil since graduation from Standard's Sales Engineering School. His mechanical engineering degree from Tri-State College of Indiana qualified him for this work. Customers of Larry's find this experience and background pay off for them.

David Bradley Tri-Trac, handy piece of farm equipment, gives farmer new opportunity for mechanization at low cost. Upper frame on which gasoline tank is mounted, is part formed in HPM press.

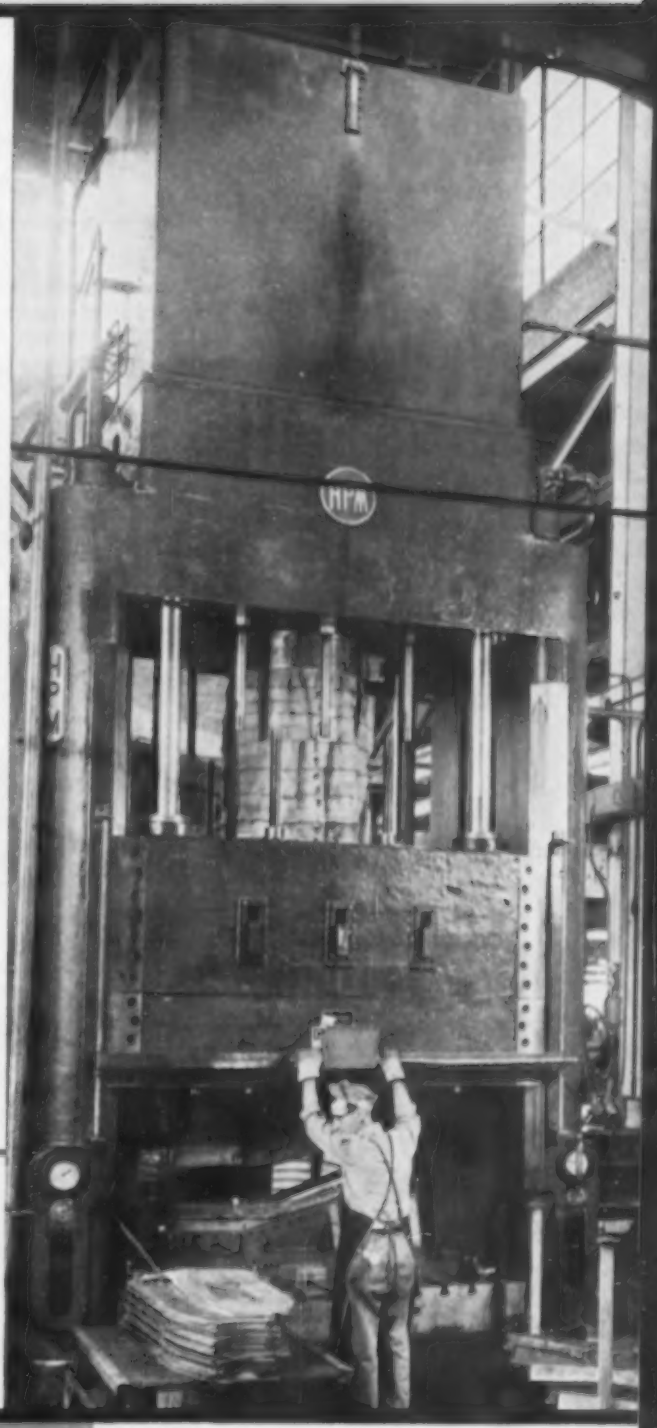
Seven years ago, David Bradley Mfg. Works installed 900 gallons of STANOIL Industrial Oil in an HPM press. There's been no down time required for lubrication maintenance since. A pump by-pass screen filter is the only filtering the oil receives, yet the system continues clean. In March, 1954, an analysis of the oil showed:

Viscosity @ 100°F.—980
Color, NPA — 6
Neutralization No.— .11

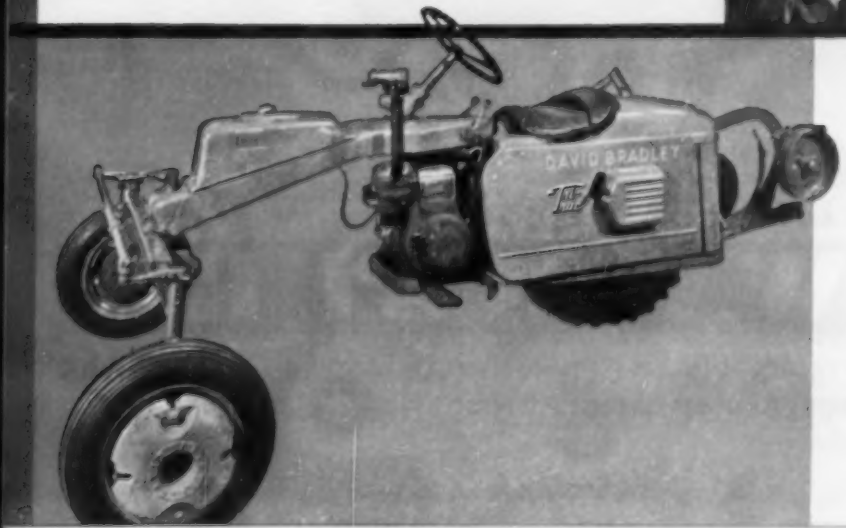
STANOIL Industrial Oil has long been at work for Bradley. Successful operations with it in other equipment caused Bradley engineers to specify STANOIL for this installation.

The HPM double acting, fast traverse hydraulic press reported on here is used to draw the upper frames for the David Bradley Tri-Trac, compact farm tractor. The Tri-Trac is the newest implement in the Bradley line. Bradley has been making farm implements since 1832.

Like to know more about STANOIL? Perhaps it can serve you as efficiently as it is serving David Bradley. Lubrication specialists in any Standard Oil office will be happy to help. In the midwest, a call to one of them will bring a prompt response. Or contact: Standard Oil Company, 910 South Michigan Avenue, Chicago 80, Illinois.



HPM 500-ton press on the upstroke after drawing upper frame for David Bradley Tri-Trac. Hydraulic system remains clean after 7 years service using STANOIL.



STANDARD

STANDARD OIL COMPANY
(Indiana)

STRIP for action . . .

The efficient action of a Flat Spring is dependent upon the quality of the STRIP STEEL.

WASHBURN

has over fifty years of experience in solving spring steel problems, to guarantee the quality of your product.

Flat Tempered and Untempered Wire in .50 to 1.25 Carbon Range.

Flat Cold Rolled Strip 6" and Narrower, Bright, Galvanized, Tinned and Cadmium Finish.

Round Untempered Low and High Carbon Spring Wires.

WASHBURN WIRE COMPANY, NEW YORK CITY

WASHBURN

104

CLEAN, UNIFORM BILLETS—STRIP—RECTANGULAR, ROUND, FLAT RODS
TEMPERED AND UNTEMPERED FLAT AND ROUND HIGH CARBON WIRES

CALENDAR
OF MEETINGS

January 24-25, Industrial Heating Equipment Association Inc.: Annual meeting, Sheraton-Cadillac, Detroit. Association address: 412 Fifth St., N.W., Washington. Secretary: T. F. Sheckels.

January 24-27, American Management Association: General management conference, Statler hotel, Los Angeles. Association address: 330 W. 42nd St., New York 36. Vice president-secretary: James O. Rice.

January 24-27, Plant Maintenance & Engineering Show: International Amphitheatre, Chicago. Information: Clapp & Poliak Inc., 341 Madison Ave., New York 17.

January 24-28, International Heating & Ventilating Exposition: Commercial Museum and Convention Hall, Philadelphia. Information: International Exposition Co., 480 Lexington Ave., New York 17. Manager E. K. Stevens.

January 25, Mining & Metallurgical Society of America: Annual meeting, Mining Club, New York. Society address: 11 Broadway, New York 4. Secretary: Lt. Col. Donald M. Liddell.

January 27, American Coke & Coal Chemicals Institute: Regional meeting, Drake hotel, Chicago. Institute address: 711—14th St., N.W., Washington 5. President: Samuel Weiss.

January 27-28, Truck-Trailer Manufacturers Association Inc.: Annual convention, Boca Raton hotel and club, Boca Raton, Fla. Association address: 710 Albee Bldg., Washington 5. Managing director: John B. Hulse.

January 31-February 4, American Institute of Electrical Engineers: Winter general meeting, Statler hotel, New York. Institute address: 33 W. 39th St., New York 18. Secretary: N. S. Hibshman.

January 31-February 4, American Society for Testing Materials: Spring committee week, Netherland-Plaza hotel, Cincinnati. Society address: 1916 Race St., Philadelphia 3. Executive secretary: Robert J. Painter.

February 2, Cutting Tool Manufacturers Association: Annual meeting, Detroit Yacht Club, Detroit. Association address: 416 Penobscot Bldg., Detroit. Secretary: Martin J. Ewald.

February 6-11, American Society of Civil Engineers: Annual meeting, U. S. Grant hotel, San Diego, Calif. Society address: 33 W. 39th St., New York 18. Secretary: Col. Wm. N. Carey.

February 7-9, American Management Association: Marketing conference, Statler hotel, New York. Association address: 330 W. 42nd St., New York 36. Vice President-secretary: James O. Rice.

February 8-10, Society of the Plastics Industry Inc.: Annual reinforced plastics division conference, Hotel Statler, Los Angeles. Society address: 67 W. 44th St., New York 36. Executive vice president: William T. Cruse.

February 10-12, National Tool & Die Manufacturers Association: Winter meeting, Ambassador hotel, Los Angeles. Association address: 907 Public Square Bldg., Cleveland. Executive secretary: George S. Eaton.

February 10-17, Automotive Electric Association: Annual meeting, Edgewater Beach hotel, Chicago. Association address: 16223 Meyers Ave., Detroit 35. Secretary: S. W. Potter.

February 14-16, American Management Association: Personnel conference, Palmer House, Chicago. Association address: 330 W. 42nd St., New York 36. Vice president-secretary: James O. Rice.

February 14-18, American Institute of Mining and Metallurgical Engineers: Annual meeting and exhibit, Conrad Hilton hotel, Chicago. Institute address: 29 W. 39th St., New York 18. Secretary: E. H. Robie.

February 17-18, Drop Forging Association: Winter meeting, Statler hotel, New York. Association address: 605 Hanna Bldg., Cleveland 15. Secretary: R. M. Seabury.

February 28-March 1, American Supply & Machinery Manufacturers' Association Inc.: Regional meeting, Warwick hotel, Philadelphia. Information: Hunter-Thomas Associates, 2130 Keith Bldg., Cleveland 15.

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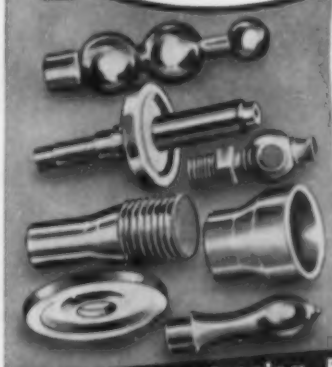

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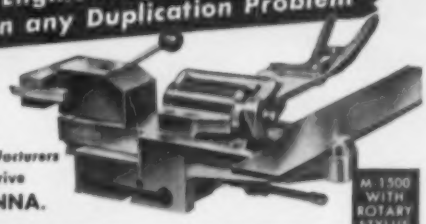

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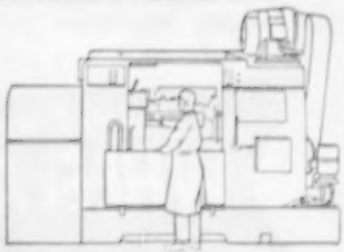

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Since switching to Wheelabrator Steel Shot abrasive costs have been slashed 80%, and machine maintenance costs drastically reduced, with a remarkable improvement experienced in cleaning time and surface appearance. Overall savings in one year's time enabled them to purchase their fourth Wheelabrator machine.

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Nothing finer!

A statement from
a conservative organization:

"Our records show that when a manufacturer once discovers the uniform quality of Roebling flat spring steel, he becomes a steady Roebling customer."

You, too, *pay* for the best spring steel... make sure you *get* it. Specify Roebling. John A. Roebling's Sons Corporation, Trenton 2, N. J.

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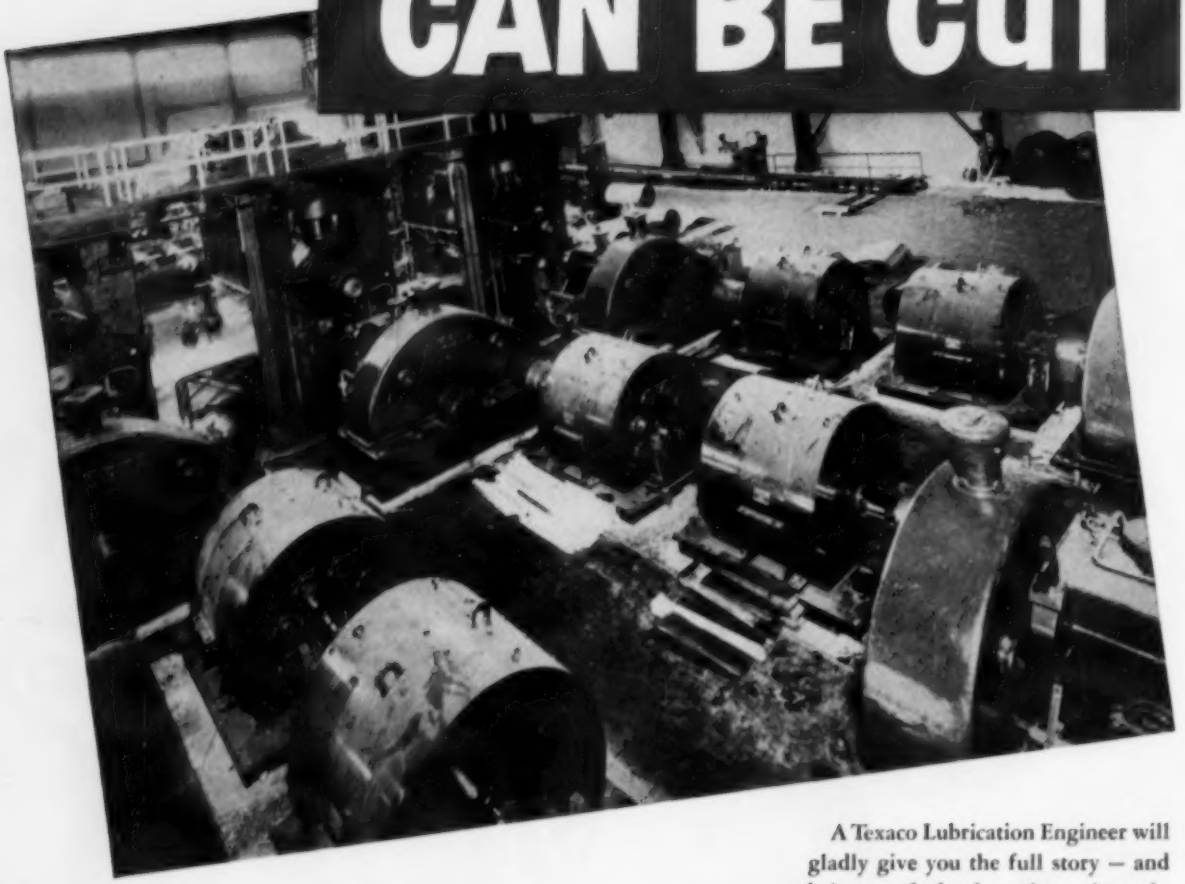
Where to look for COSTS THAT CAN BE CUT



AS EVERY mill operator knows, reduced costs mean increased profits. And there are many ways and places where effective lubrication — *Texaco* — can help you.

Your rolling operations, for example. On the drive side, *Texaco Meropa Lubricant* will keep gears and bearings fully protected and add substantially to their life. For the roll bearings themselves, *Texaco Regal Oil* in the circulating system is your best assurance of full protection and low maintenance costs.

A Texaco Lubrication Engineer will gladly give you the full story — and help you find other places throughout your mill where costs can be cut and production efficiency improved.

Just call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write:

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TUNE IN: TEXACO STAR THEATER starring JIMMY DURANTE or DONALD O'CONNOR, on TV Sat. nights. METROPOLITAN OPERA radio broadcasts Sat. afternoons.

STEEL
January 24, 1955

Metalworking Outlook

Rail-Truck Peace?

Top administration men are delighted by the formation of the Council of Rail & Truck Common Carriers. The group has far-reaching transportation legislation to propose. Its chances of Congressional approval will be better if railroaders and truckers bury the hatchet. The council consists of the presidents of seven eastern railroads and seven eastern trucking companies. Its objectives (to tone down the shrill publicity war between the two groups and to do something about rising competition from contract truckers) are limited, but, at least, it is a start. The White House hasn't revealed details of its transportation proposals, but, odds are, one objective will be to help railroads.

For National Highways

Another objective of transportation policy will be the national highway system, which would help trucks. On Jan. 27 the President will give specifics. He wants a 40,000-mile network of cross-state routes linking up main cities, seaports, manufacturing and distributing centers and connecting with important Canadian and Mexican arteries. His plan will call for a new government-owned highway corporation to foot a $24-billion construction bill over the next ten years, on top of reduced regular federal aid of about $6 billion. Prospects for congressional approval: Fairly good even though it's opposed by such influential legislators as Sen. Harry F. Byrd (Dem., Va.).

Not Enough Airports

A third phase of the President's transportation proposals will concern air cargo and air travel. Watch for him to urge increased spending to improve existing airports and to build new ones. Already, we are short an estimated 300 airports throughout the nation, and the existing 2060 have a steadily more difficult time handling mounting traffic. Airlines, it is forecast, will account for 45 per cent of the $30 billion anticipated to be spent annually on intercity domestic travel by 1964.

Minnesota Minerals

Watch mineral developments in Minnesota. Production of taconite pellets there will reach 1-million tons in 1955, over 4-million tons in 1956, over 12-million tons in 1958 and perhaps 40-million tons by 1970. In the northwestern part of the state vast copper-nickel deposits are being explored by International Nickel Co. Inc. and others. They are low-grade reserves but eventually may be as important as taconite. In addition, the state's Gunflint area boasts large ilmenite (titanium) deposits.

Now, an Electric Watch

Watchmakers can't depend upon new model changes every year to get customers to buy timepieces like autos. But Elgin National Watch Co., Elgin, Ill., reports "satisfactory progress" on a new model which should stimulate buyer demand. It's an electronic wrist watch which will be powered

Technical Outlook—p. 69 Market Outlook—p. 99

by an aspirin-size battery instead of a mainspring. "We don't know when it'll be on the market," officials state, "or how much it'll cost. But it'll be competitive with conventional watches."

Coming: Magnesium Luggage

The first mass-produced consumer product to be made of magnesium will be luggage. Dow Chemical Co. and Shwayder Brothers are co-operating to produce Shwayder's Samsonite in the metal. Shwayder will draw on defense contracting experience in the new venture, has spent six years on research for the project and will produce the product in its Denver plant.

Industrial Volunteers

"Large-loss industrial fires are increasing, causing 23 per cent of all fire losses in one year." So says the National Board of Fire Underwriters. In a survey, Associated Industries of Cleveland says that the use of company fire brigades is common. AIC finds that members of a plant fire brigade are usually volunteers and that there's rarely outside insurance coverage on them. Extra pay is seldom granted, but, sometimes, token bonuses of $10 or so are given at the end of the year.

Goings-on at GM

General Motors notes: Two dream cars at the Motorama have the LaSalle name. While they are now purely dream cars, some observers think GM is toying with the idea of starting a LaSalle line . . . GM's engineering department is doing work on lightweight, high-speed trains . . . The corporation president, Harlow H. Curtice, says its future planning is based on steel, not plastics. Some small parts may be made of plastics . . . Mr. Curtice forecasts a 1955 gross national product of about $370 billion . . . GM expects to start labor negotiations about the end of March . . . It will oppose proposals for a 30-hour week.

Straws in the Wind

Atlantic Steel Co. will spend $10 million on modernization and expansion, including a merchant bar and rod mill and a second electric furnace . . . With some exceptions, early in February the Defense department will charge these new monthly rentals on machine tools: 2 per cent of the acquisition cost on tools built in 1950 and later; 1.5 per cent on tools built from 1942 through 1949; 1 per cent on tools built before 1942 . . . Beginning in March the Iron & Steel Division of Business & Defense Services Administration will publish a quarterly bulletin on international trade in iron and steel.

This Week in Metalworking

Mechanization can help reduce the cost of paper work, now taking about 10 per cent of the sales dollar (p. 37) . . . Anaconda Copper Mining Co. is building basic aluminum facilities (p. 39) . . . The 1954 median wage settlement was for just a little more than 5 cents (p. 42) . . . Otis Elevator Co. told its employees: "Help reduce costs or we'll move" (p. 43) . . . Carrier Corp. hopes to crack a $14-billion market with a new line of equipment for year-round air conditioning of existing homes (p. 44) . . . Management salaries have climbed 23.5 per cent since 1949 (p. 51) . . . The new federal budget could mean more U.S. spending with metalworking (p. 57).

Fact:

Rugged Westinghouse Industrial Heaters available in 24 Sizes . . . 8 Coil Selections . . . 150 Ratings from 100,000 to 2,500,000 BTU/hr . . . 2,000 to 25,000 CFM each

HEAVY-DUTY COIL. Tapered steel fins bonded to 1" wrought iron pipe—with internal steam distributing pipe—solder dipped for permanent bond and corrosion resistance.

1. Proven, Westinghouse-manufactured, extended surface heating coils good for continuous operation up to 200 psig.

2. Die-formed casings with rounded corners eliminate accidents and dirt catching pockets. Front and back panels easily removable.

3. Multiple louvered outlets for efficient distribution of heated air.

4. Self-aligning, grease-lubricated ball bearings mounted outside casing, readily serviceable.

5. Face and by-pass dampers permit continuous air circulation to maintain uniform temperatures.

NOTE: Louver type mixing box accessory permits introduction of fresh air for make-up and ventilation, with or without filters.

Solve your space heating problems with Westinghouse-Sturtevant Industrial Heaters. Eliminate cold, drafty conditions caused by excessive cold infiltration through leakage or exhaust.

Two Types With Wide Applications:

GENERAL PURPOSE HEATER . . . For manufacturing areas, warehouses, garages, commercial buildings—with standard non-ferrous heating coils.

HEAVY-DUTY HEATER . . . For continuous-duty high-pressure systems, or industrial process work—with wrought iron heating coils.

The compact packaged engineering of every Westinghouse-Sturtevant Industrial Heater provides units for mounting on floor, walls, or suspended from ceilings. In short, they can be placed where they will do the most good, and can be relocated to meet any change in plant layout.

Every unit is backed with a Westinghouse exclusive—*one warranty*. Only Westinghouse makes all principal components—Fans, Heating Coils, and Motors. You can get unit engineering and single equipment responsibility.

MORE FACTS? To find out how to solve your particular heating problem, call your Westinghouse-Sturtevant Sales Engineer . . . he is the "Man With The Facts" on heating, air handling, and electronic air cleaning . . . or fill in coupon below.

WESTINGHOUSE AIR HANDLING

YOU CAN BE SURE...IF IT'S

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Please send more information on your Industrial Heaters.

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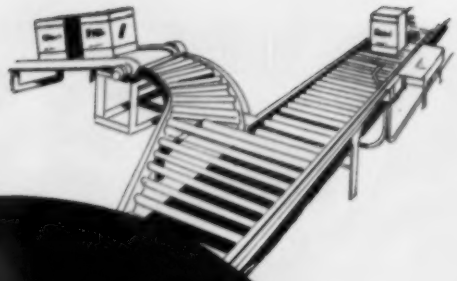
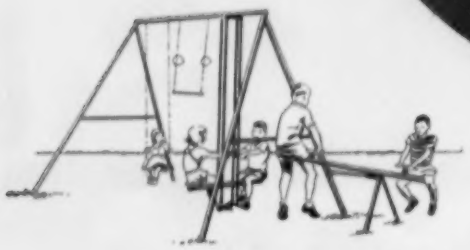
NEW TUBING with a Special Zinc Coating





Have you avoided using welded steel tubing in your products because you couldn't get the rust protection of a zinc coating? Now you can obtain Armco Steel Tubing made of ZINCGRIP, the special zinc-coated steel made by a patented process. Even the welded and recoated seam is so smooth that it can be found only by careful inspection.

IT'S A SALES-AID

Why not find out all about this new lightweight structural? It has already improved many other products—made them more saleable.

Armco ZINCGRIP Tubing is supplied not only in rounds, but in squares, rectangular shapes, hexagons, octagons and special shapes, all with unbroken zinc coatings. That's because the special hot-dip coating on ZINCGRIP takes as severe forming as the steel base. It does not flake or peel.

Rounds are produced in outside diameters from $\frac{5}{8}$-inch through 3 inches and in wall thicknesses of 20 gage through 12 gage, depending on size. For complete information just fill out and mail the coupon.

OTHER SPECIAL ARMCO STEELS

Besides ZINCGRIP Tubing, Armco produces hot- and cold-rolled welded steel tubing. Armco is also a major producer of Cold-Rolled Sheets and Strip, Enameling Iron, Electrical Steels, Stainless Steels, and sole producer of ALUMINIZED STEEL, ZINCGRIP and ZINCGRIP PAINTGRIP Sheets and coils.

ARMCO STEEL CORPORATION

3954 Curtis Street, Middletown, Ohio

Export: The Armco International Corp.

☐ Send me information on Armco ZINCGRIP Tubing.

☐ Send me your booklet, "Armco Welded Steel Tubing."

*Send me information on these other Armco steels*____

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Rebirth of the Salesman

Twelve to sixteen months ago the economy was moving from a lush sellers' market into the shakeout period. Industrial executives were gravely concerned. Young salesmen were new to the hard sell ahead. Older salesmen, trained in more competitive times, were soft. Their sales abilities had atrophied.

How would this sales team perform in a keenly competitive economy? Management was apprehensive. As observers of the industrial scene, we shared their doubt.

Now, a year later, we have been doing some checking on performances. We are pleased to report they look pretty good. Industrial salesmen generally proved themselves when the going was rough. There are figures and testimonies to show it.

While 1954 was the shakeout year, the shakeout was surprisingly mild. Metalworking sales in a keenly competitive year totaled $112 billion, second only to record 1953. Part of this showing must be attributed to a good selling job.

Even more impressive is what purchasing people and other members of the industrial buying team say about today's salesman.

He is more scientific than his counterpart of two decades ago. His sales story is better documented. He knows more about his product and what it will do for the potential customer.

Technically, he is better trained. He is likely to be an engineer. He can go into the plant and talk to plant people at their level. He can create a need for his product.

Actually, he is helping his customers produce goods better, faster, cheaper. He is showing them how to cut costs, even if his recommendation cuts his immediate commission. Joseph A. Teece, Fansteel Metallurgical's vice president of purchasing, tells about the belt salesman who walked through the plant and made two simple suggestions that saved Fansteel $4500 in belt purchases.

You can't forget the boys in the back room—the marketing researchers, the advertising managers, the sales promotion gang—nor the more scientific purchasing team that requires better selling. But a lot of credit is due those industrial salesmen who have and are proving they can do it when the going is uphill.

We suspect the 1935 salesman would find the 1955 model formidable competition.

Walter J. Campbell

MANAGING EDITOR

"20,000 lbs. of STRIP tomorrow morning? SURE!"

It was 6:45 one Wednesday evening when Bob Rans of the Chicago Sheet and Strip desk was interrupted at the chore of drying dinner dishes by a phone call. One of our good customers was in a jam and had traced Bob down at home. "If I don't get 20,000 pounds of slit coil stock tomorrow morning we'll have to shut down. Can Ryerson do it?"

Bob immediately called the sheet and strip night dispatcher and the second shift foreman at the plant. The order was added to the night schedule and was ready by dawn. At 9:45 AM the required steel—cut to size and ready to use—was set down in the customer's suburban plant.

Whether you need sheets and strip, or bars, shapes and plates, you can depend on Ryerson for prompt, personal service. We have the world's largest steel stocks—the unequalled facilities—and above all the teamwork of specialists to deliver as promised. So, when you need *every* kind of steel, be sure... call Ryerson.

Principal products: Bars, structurals, plates, sheets, tubing, alloys, stainless, reinforcing, machinery & tools, etc.

RYERSON STEEL

JOSEPH T. RYERSON & SON, INC. PLANTS AT: NEW YORK • BOSTON • PHILADELPHIA • CHARLOTTE, N. C. • CINCINNATI • CLEVELAND DETROIT • PITTSBURGH • BUFFALO • CHICAGO • M'LWAUKEE • ST. LOUIS • LOS ANGELES • SAN FRANCISCO • SPOKANE • SEATTLE

Workmen install power unit in Burroughs' E-101 electronic computer

Coming: More Office Automation

Only about 10,000 establishments can use it to a major degree. But nearly everyone to some extent can mechanize paper work, now costing 10 cents of the sales dollar

IN 1900 for every 30 factory workers there was one clerk sitting in the front office. Today there are about ten for every 30 in the plant.

No small factor in the increasing proportion of clerical help is the government. Wage and hour records, social security and withholding tax deductions are typical burdens. Also important, but more nebulous, is the trend of management to make decisions based on statistics and probability rather than hunches. Such fields as market research, cost analysis and inventory control require facts and figures which mean more clerks.

Paperwork Pirate—But not only has the number of clerks increased: rising clerical demand has contributed to higher office help wages as well. The result: Today's typical firm finds about 10 per cent of its sales dollar going into a by-product of doing business—paper work.

For many firms the figure is much higher. The cost matter, coupled with the penchant of even well-paid clerks occasionally to goof, get married or squabble among themselves, make it inevitable that management eye recent "office automation" developments covetously. Although few expect electronics and automation to take over the clerical function, not a few hope for an office the white collar equivalent of an engine block machining line.

Electronic Gangplank — Most business machine firms, whose industry notched $619 million sales in 1953 almost entirely on non-electronic devices, are somewhat alarmed by the "blue sky" enthusiasm of management. Their point: Equipment can be built to do virtually any office job. But automation is predicated on sufficient volume to dissipate equipment costs.

One business machine firm spokesman estimates that of perhaps 4 million business offices in the country, only about 10,000 warrant a major degree of automation. "Reducing a job to a routine is all we ask to automate it," he sighs, "but in most offices the clerk will prove to be cheaper." His sigh comes from the potential customers he loses every week who discover their volume doesn't warrant the often very special purpose equipment required to do a given office job.

First Mates — Of a less special

purpose nature are such intellects as UNIVAC and UDEC, electronic computers of Remington Rand Inc. and Burroughs Corp., respectively. These data processing devices can handle such problems as a complete payroll for 15,000 in four hours or replace about 2500 mathematicians with calculators on a research problem. The trouble is that many firms don't have that many mathematicians. Pegged at a cost of $500,000 to $1 million or rented at perhaps $400 per hour, the electronic brain's capacity is hampered by the fact that most firms don't think that big.

It should quickly be pointed out, however, that firms like General Electric Co., U. S. Steel Corp. and E. I. du Pont de Nemours & Co. Inc. are finding the equipment smart in business. Republic Steel Corp., contemplating the computer move, reports that "our intention is to use the equipment on all types of work. Sales management will be able to stay right up to the minute on orders, backlogs and inventory status. Orders can be precision-distributed between production units with fastest possible co-ordination of free capacity and new order allocation."

Treasure Chest — "If any one production operation becomes snarled," continues E. C. Mausz, heading Republic's research on computers, "we'll have immediately available from magnetic tape the location of alternate free capacity, how best to reschedule and what long-term effects on planning will be. Eventual use of the equipment is only limited by the speed with which information can be fed into and read out of the machines."

That's one of the things business machine makers are working on right now. They have to harness such astronomical aptitude as the capacity to do 10,000 additions a second. With present input and output equipment you can still add two and two in your head more quickly. One interesting approach to the output bottleneck is the Burroughs Series G printer which will print at a speed of over 43,000 characters a minute. Used in a utility-billing operation, this machine can turn out 2200 post card bills every ten minutes.

Potential—That gives some idea of the computer potential, already phenomenally faster in handling complex data than conventional means. The machines' speed today makes available to management data that not long ago would have been too laborious to calculate or obsolete when determined.

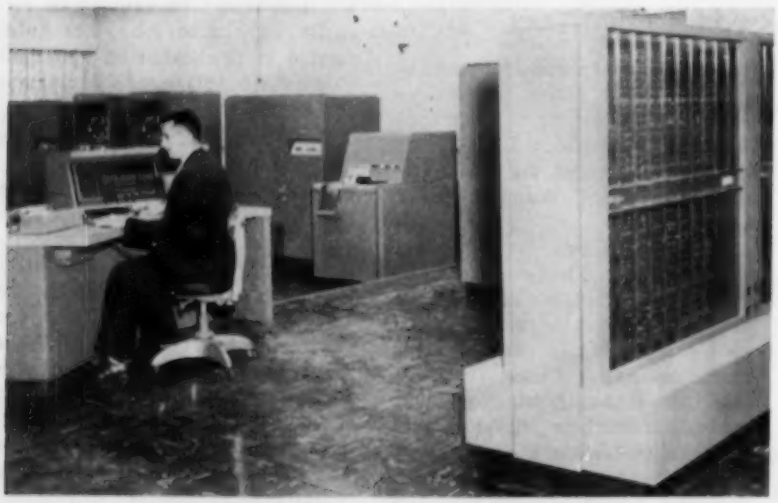
But these are machines useful only to the nation's largest institutions. Being designed to fill the gap between the electric rotary calculator on the one hand and the large-scale electronic computers on the other, however, are a new crop of intermediate devices. Designed to handle such items as tax assessment, variable budget analyses, payrolls and actuarial computations, these computers will sell in the range from $25,000 to $100,000.

Bread-and-Butter Machines — A good example is the Burroughs E-101 priced at $32,500. Initial production is just getting under way, as shown in the photo on page 37 and the machine is designed for volume production. Capable of doing all the operations previously described and more, the machine utilizes a conventional keyboard. It may be shifted from one sequence of operations to another by inserting pins in an electric circuit pinboard according to code on a corresponding punched card. Although this machine lacks such features as random access and is somewhat less efficient in all-out brainpower problems, it still is nobody's fool and is claimed to be top-drawer on industry problems.

Other firms like International Business Machines Inc. also are getting into the intermediate field. The first of IBM's new model 650 was recently installed and 150 of the pending 450 orders will be filled in 1955. Renting for about $3500 a month compared with $25,000 monthly for the giant model 702, this machine is described as a bridge between punched card equipment and large-scale computers.

Makers Meet Demand—Most industry observers agree the fast thinking of the large machines has played a key role in creating management interest in the smaller machines useable by the medium-sized firm. Sensing the potential demand, Underwood Corp. has taken over Electronic Computer Corp. and Royal Typewriter Co. Inc. has merged with McBee Co. National Cash Register Co., Marchant Calculators Inc., Radio Corp. of America and Consolidated Engineering Corp. are among others listed by the Comptrollership Foundation in a total of 53 manufacturers in the electronic business machine field.

It is obvious, however, that automation and electronics are two different things. Depending on the definition of automation and the definition of electronics, the degree present among equipment already in offices varies. If electronics is defined as use of electrical sensing circuits as in sorting punched cards, for example, its scope is already relatively wide by contrast to the definition of electronics as equipment utilizing



The IBM-type "702" electronic-data processing machine is designed for the large business organization. Operations are supervised from console, left foreground

vacuum tubes or transistors and pulse sequences.

Definition—By the same token, if automation is defined as any device taking manual effort out of office work, the Dictaphone by which instructions may be received by a party without ever being reduced to written form and other devices in common use make automation pretty widespread already.

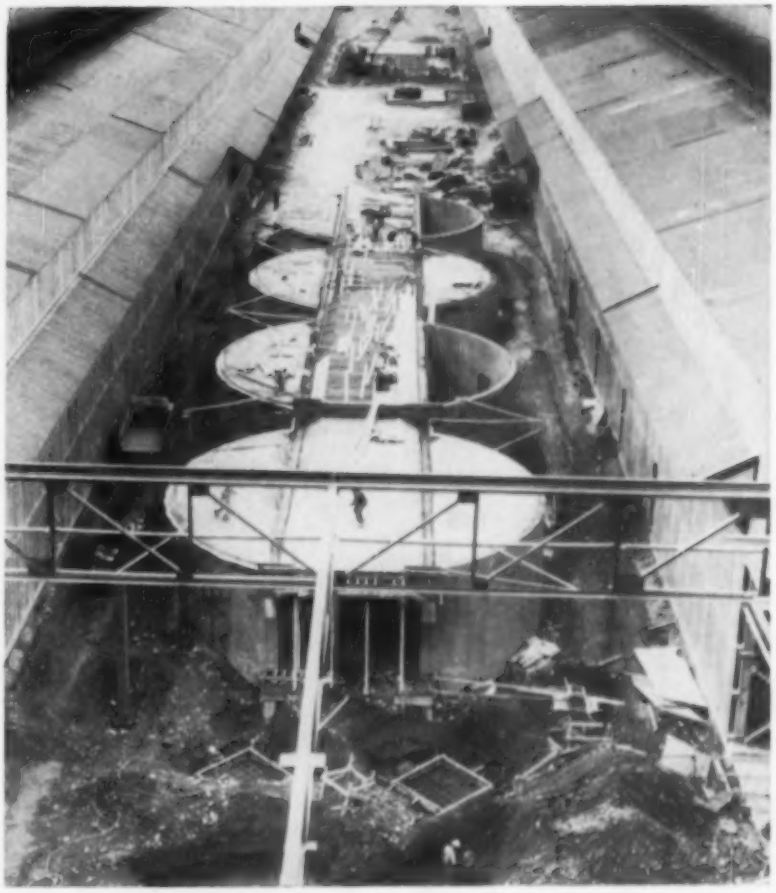
Among more recent developments are the use of machines which punch tape or cards as orders are received or placed, accounts totaled, etc. The tape then can be rapidly run through central accounting machines eliminating the need for recopying manually with its opportunity for error.

Future — Developments in eliminating paper handling and manual copying at the heart of paper work have already come into widespread use at banks, insurance companies and similar firms and are finding their way into industry in increasing numbers. Integration of office systems so that coded data can be transferred from one channel to another is the biggest field of opportunity for most business firms today, believes one spokesman.

For the future, even though the electronic and completely automatic office remains a goal as abstract as the automatic factory, electronic machines will take their place among standard business machines to process more data automatically. But here's the way Ray R. Eppert, executive vice president of Burroughs Corp. sums it up.

Summing Up—"Most engineers today agree electronics can be made to accomplish almost any job providing only that a person is willing to pay the price. In a number of areas, moreover, the price is entirely justified by the results achieved." But . . ."electronics is not a panacea. Nor is it an end in itself. It represents but one of a number of useful techniques; and in the last analysis, techniques are of secondary importance.

"What we are all looking for is equipment that will do the job better, faster and more economically than is possible with the equipment we have now. If a device meets these requirements, it matters little whether it is electronic, magnetic, electro-mechanical or a combination of them all."



Heavy investment in new plant is dowry pledge as . . .

Anaconda Copper Woos Aluminum

ANACONDA Copper Mining Co.'s bid to carve out a new name in aluminum is strengthened by a new $25-million integrated mill to be built on the outskirts of Terre Haute, Ind.

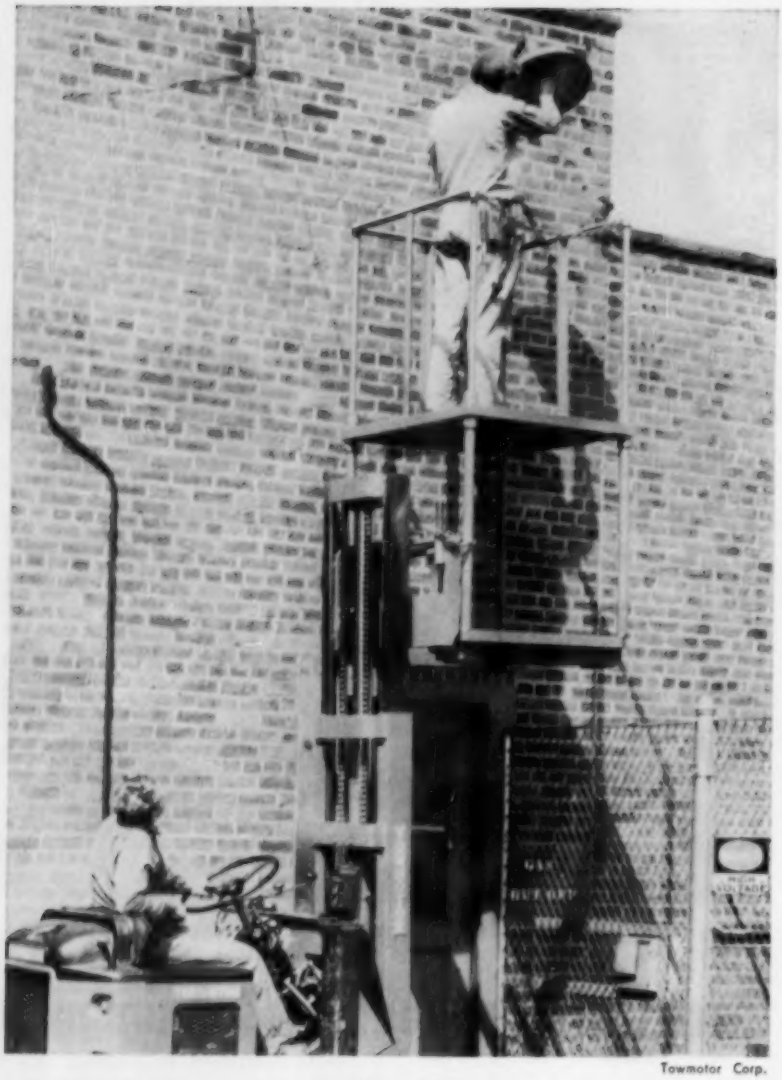
The new mill will be run by American Brass Co., a wholly owned subsidiary of Anaconda. Now vice president of American Brass Co.'s Torrington, Conn., plant, James F. Ackerman will head up operations.

Integration—Ingot requirements of both the new mill and Anaconda Wire & Cable Co. will be met from a reduction plant at Columbia Falls, Mont., to be completed by the parent company about the middle of this year. Annual production is projected at 60,000 tons of ingot aluminum.

Ground will be broken for the new mill as soon as Anaconda's planning department, under Wilbur Jurden, chief engineer, has completed preparations. It will be of single-story, heavy-steel construction, with overhead - crane service throughout.

Production Planning—The mill will finally provide jobs for about 1000 people, most of whom will be recruited locally. Production will include casting of aluminum ingots and billets, rolling of sheet and strip and extrusion of rods, tubes and special shapes.

The plans point up an increasing trend among copper companies to add aluminum to their products line. Sometimes either copper or aluminum can be used for a given job, so many producers feel it's just plain horse sense to be able to quote on either one.



Towmotor Corp.

New products and new methods help make . . .

Maintenance for Competitive Era

THE PLANT MAINTENANCE industry is really cleaning up.

It's a 1,334,000-employee industry which paid out $5.4 billion in salaries and consumed about $4.4 billion in materials in 1954.

Bigger Plans—Those are the current dimensions of the maintenance industry as estimated at Clapp & Poliak's Plant Maintenance & Engineering Conference & Show, now running in Chicago (Jan. 24-27). Reports indicate maintenance men are looking for an even bigger place in management thinking.

Says David J. Godschall, plant engineer, Heintz Mfg. Co., Philadelphia: ". . . the first and most important 'want' of maintenance" is to be on the team of competitive American industry. To do so requires "planning and scheduling of maintenance work, preventive maintenance, progressive equipment replacement programs, planned lubrication and planned corrosion control."

More for Less—Planning is offered as probably the best way of getting more maintenance for less money, the second-ranking concern of the industry. New products and equipment are also cited as good cost cutters. John J. Donahue, supervisor, plant sanitation section, Research Laboratories Division, General Motors Corp., reports the cost of plant sanitation at GM's Technical Center at Warren, Mich., was $213,518.08 in 1954 or 43 cents per sq ft. "Through use of better materials and new methods we have high hopes of reducing the square-foot cost substantially," says Mr. Donahue.

It should be noted that many of the new products mentioned as the means to reduced costs are metalworking products. Among them are power sweepers, auto scrubbers, disc polishers, scrubbing machines and wall-washing machines.

Sharper Selection — While in previous years the maintenance industry has urged apprentice or trainee programs for medium and large companies, it's emphasized this year that standards for trainees must necessarily rise. "With all the complex automatic machinery, electronic controls and new treatment processes in use today and planned for the future, the recruits must have outstanding intelligence, initiative and sound thinking ability," says L. E. Clover, manager, plant engineering and maintenance services, General Electric Realty Corp., Schenectady, N. Y.

Simplified Record-keeping

Employers will find it easier to keep records of hours worked by office and production employees if they take advantage of a special policy in the record-keeping regulations of the Fair Labor Standards Act (part 516).

The U. S. Department of Labor reminds employers that it need not keep records of the starting and stopping time of workers who have fixed daily and weekly hours if certain conditions are met: Records must clearly show the exact schedule for the employee. They must contain a statement made each pay period that the employees worked neither more nor less than the scheduled hours (except where otherwise noted).

Since no particular order or record form is required, the employer may set up any system he chooses so long as the records contain the specified information.

Mr. Taconite (holding pan) displays taconite pellets to friends. The pellets were produced in a pilot plant

E. W. Davis: How Vision, Persistence Made Taconite Pay

FOUR DECADES ago a young professor at the University of Minnesota began to worry about the depletion of the then seemingly inexhaustible supplies of rich iron ore on the Mesabi range. He warned it eventually would be necessary to extract iron from the iron-bearing rock surrounding the rich ore deposits. He argued for the development of processes to beneficiate the lean rock and for a state tax structure that would encourage such development.

For years his cause was a lost one. Few shared his concern over the eventual depletion of direct-shipping ores. In Minnesota they thought his tax law proposals were a bit crazy.

But the professor, Dr. Edward Wilson Davis, was stubborn. Today, his vision and persistence is paying off.

Reward—A billion and a quarter dollars is being invested in plants to process taconite. By 1970, 30-million tons of taconite pellets may be shipped to steel mills to assure a substantial new domestic source for iron.

The idea of processing taconite is accepted. Professor Davis is regarded as a benefactor of industry and his adopted state of Minnesota. Reserve Mining Co.'s new film, "Taconite", premiered in Cleveland last week before the Cleveland Advertising Club, pays tribute to Dr. Davis and his contribution to the development.

Reserve Mining Co. named its plant at Beaver Bay after him.

Modest—Professor Davis gets a little irked when he is singled out as the man behind the development. He points out that no one man could have worked out the processes involved; that there are scores of individuals, including his associates at the Mines Experiment Station in Minnesota, people in the iron ore, steel and equipment - manufacturing industries, who should share the credit.

But people go right on naming Dr. Davis as the man. He is variously dubbed the "Father of Taconite," "Mr. Taconite," "the Lone Ranger" and "Saviour of the Range."

And his admirers are probably right. While many made valuable contributions, it was Dr. Davis who pushed the idea, rescued the development process when others despaired. Certainly, it was Dr. Davis who fought for and won a reform in Minnesota's tax law which removed the local property tax on ore in the ground and substituted a per-ton tax on taconite processed and shipped.

Sportsman—At 67, Dr. Davis is slender, wiry and deceptively mild. Although his first interest is iron ore, especially taconite, he has many others.

Last autumn an editor of STEEL had dinner with Dr. Davis at a northern Minnesota resort. Conversation, with Dr. Davis assuming the lead, covered Big Ten football prospects, hunting, fishing and a half dozen other subjects. The next morning, Dr. Davis shouldered a canoe and pack and headed into the Canadian wilderness, ostensibly for a fishing vacation.

But those who knew him well insisted that part of his time would be spent in planning how to utilize atomic energy to blow the overburden from underground ores.

Crazy? That's what they used to say about taconite.

1954 WAGE SETTLEMENTS IN METALWORKING

	Iron, Steel and Their Products	Automobiles	Machinery	Electrical Machinery	Nonferrous Metals
Total Settlements	166	37	216	187	67
Decrease	—	2	—	—	—
No general increase	8	5	17	20	5
1-3 cents per hour	16	4	17	8	2
4-6 cents per hour	79	14	107	110	41
7-9 cents per hour	26	4	38	23	13
10-12 cents per hour	17	4	15	17	4
13-15 cents per hour	1	3	1	2	1
Over 15 cents per hour	6	—	6	—	—
Unspecified increases	13	1	15	7	1
Pension settlements	20	5	24	19	15
Insurance settlements	54	7	62	51	30
Escalator clauses	—	1	2	1	—
Annual increases	2	1	12	9	—

Source: Bureau of National Affairs Inc.

Hourly Wages Hew Economy Line

Union representatives had a harder time upping the ante in 1954. Analysis of 4000 contracts puts the typical settlement at about a nickel, compared to 8 cents in '53

LAST YEAR'S tougher business climate was felt at the hourly wage bargaining table.

A survey by the Bureau of National Affairs shows that settlements reached through collective bargaining were generally smaller than those negotiated in 1953. They also slowly and steadily declined in amount throughout the year. The median 1954 settlement dropped more than 2 cents—5.9 against 8.2 cents in 1953. The median wage increase was 6.1 cents in 1954, down from 8.5 cents in 1953. (Difference between wage and settlement figures is due to escalator and similar contract provisions.)

Smaller Settlements—The survey is based on 4000 company-union wage settlements covering a variety of industries, from apparel to utilities. However, the table shows that patterns in typical metalworking industries hewed the line. There was wide acceptance of a nickel, plus or minus 1 cent, in steel, aircraft, electrical products, automobiles, machinery and nonferrous metals.

According to BNA, more than 60 per cent of all negotiated wage settlements in the past year were for increases of 6 cents or less. Only 40 per cent of 1953's settlements were in this range.

Fringes—Pension and insurance settlements, escalator clauses and annual increases are also detailed in the table. More escalators were reported discontinued in 1954 than in 1953, and fewer were negotiated. Deferred increases were negotiated with about the same frequency in 1953 and 1954.

There was a continuing trend toward adoption and improvement of pension and insurance plans. Other fringes, like unconditional pay for holidays falling on a Saturday and reduction of service requirements for a third week of paid vacation, continued strong.

For the coming year, the much-discussed guaranteed annual wage demands may pipe the tune. (For trends in executive pay, see p. 51.)

National Tube Ships Plastic Pipe

U. S. Steel Corp. shipped its first order of plastic pipe Jan. 17 from its National Tube Division plant in Gary, Ind. Initial production will be polyethylene pipe, ranging in size from ½ to 6 in.

Manufacturing facilities will permit eventual production of pipe from various other plastic materials and in a greater size range.

Otis President L. A. Petersen tells employees . . .

'Help Reduce Costs or We'll Move'

COST CUTTING can no longer be dismissed with a perfunctory gesture.

The drive has gained momentum in direct ratio to the increase in competition. In fact, emphasis on cost cutting may uproot a firm with a 102-year history in one town.

Reduce or Else — That is the case with Otis Elevator Co., which found it could save several million dollars by establishing a single midwestern plant to replace present operations at Yonkers, N. Y., and Harrison, N. J. Otis President L. A. Petersen has put the proposition squarely up to employees in those plants and the local governments involved. Unless costs can be reduced in the present two-plant operation, Otis will move those functions to a single midwestern location.

The company has been in Yonkers for 102 years, in Harrison for 30 years.

Indicative — The Otis situation has a significance far beyond the city limits of those two towns. It indicates a new turn in industry's path toward cost cutting. For one thing, the Otis company is not begging its case. While Mr. Petersen did not outline the company's specific program of economies in the first announcement, he indicated it included asking employees to eliminate lost time and motion, use old equipment efficiently and get the utmost out of new equipment which may be installed.

Another twist is the interest being evinced by governments which stand to lose through the Otis move. Said Charles Curran, Yonkers city manager: "We certainly don't want to lose Otis. We'll give them all the co-operation we can." Dr. Isador Lubin, New York State industrial Commissioner, is following the case closely. New York State Governor W. Averell Harriman has indicated he intends to set up state machinery to intervene when industry plans to leave New York.

Comment Coming — Union officials of Local 453, International Union of Electrical Workers, C.I.O., representing Yonkers employees, indicated they would have statements to make after they investigated and analyzed Mr. Petersen's remarks. The union did point out that the Otis president stated a few months ago that the outlook was for increased business. "It would seem no case of hardship has been presented here, whatsoever," the union observed.

Mr. Petersen did, in fact, tell the employees that his statements now should not be interpreted as indicating the company has ceased to be profitable or is on the verge of becoming unprofitable. But, he pointed out, the number of Otis' competitors has more than doubled during the last eight years to a present total of 262; that substantial reductions in cost are necessary to retain the company's competitive position.

Operation Mothball

As a precautionary measure against war emergency, mothballing operations are being initiated by the U. S. Army in the San Francisco bay area.

A layaway contract with General Metal Corp.'s foundry in Oakland has already been signed, while another is in final negotiation with Columbia-Geneva Steel Division of U. S. Steel Corp. Another company also actively discussing agreements is Rheem Mfg. Co.

One System: Cooling and Heating

Carrier Corp. predicts a $14-billion market in air conditioning existing homes. Its newly developed line has almost universal application

EQUIPMENT just announced may open up a new $14-billion market for air conditioning. Developed by Carrier Corp., the systems will provide year-round cooling as well as heating for homes previously considered too difficult or expensive to air condition.

Included are homes which heat with hot water or steam heat and those without a central heating system. Installed cost in the average house will run about $700 to $1100 more than for a conventional heating plant alone.

Basic Units—Two units form the basic new line: The summer Weathermaker model for air conditioning only, and the year-round Weathermaker unit for heating and air conditioning.

The Weathermaker device consists of a small cooling and dehumidifying coil package, which is at the discharge end of the furnace, and a weather and tamperproof refrigerating device, requiring no water, which is placed outside the home.

With vertical furnaces, the coil mechanism is slipped into the ductwork on top of the furnace. On horizontal models it is placed at the outlet end, using the same type support or suspension as the heating plant. In a counterflow heating system, normally found in the closet of a slab or crawl-space home, the furnace is lifted and the coil placed underneath.

Small But Mighty — The summer Weathermaker consists of a unit not much larger than a room air conditioner which is installed with minimum ductwork inside the home. It is connected to a refrigerating package which uses no water.

The year-round Weathermaker handles the complete summer and winter air conditioning job. It supplies cooling, dehumidifying, heating, air circulation and filtering. A simple control shifts it from cooling to heating, and the same thermostat sets the temperature level for summer and winter operation. The unit is available either with air-cooled refrigeration using no water or as a water-cooled system. Oil or gas is used for heating purposes.

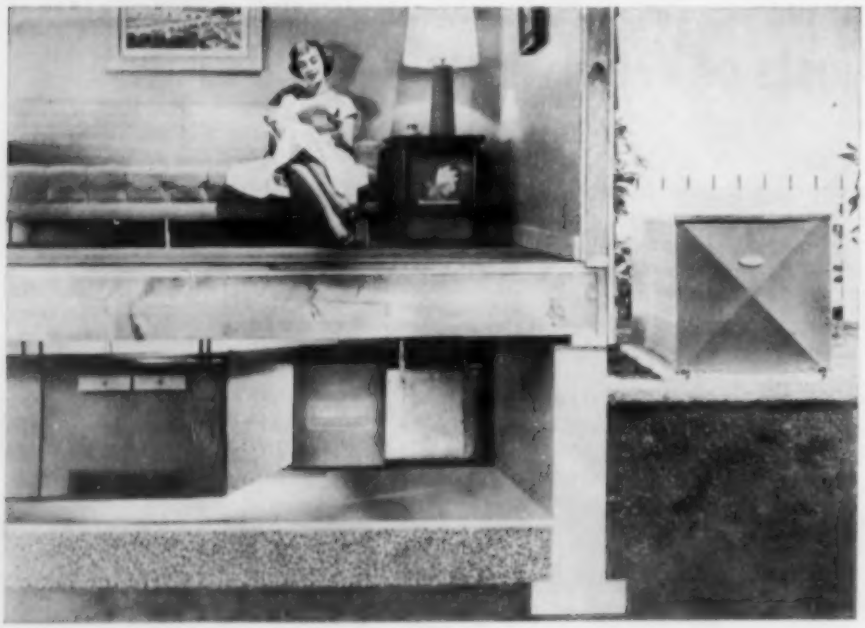
Regulation—All the new Carrier systems from ½-hp up are equipped with sensitive thermostats for completely automatic temperature regulation. Controls under the hinged louver panel may be set to provide ventilation with the outside air, while adjustable louvers in the hinged-grille panel permit directional control of air circulation.

With sales of central home air-conditioning equipment rising from 50,000 units in 1953 to 75,000 last year, Carrier Corp. is predicting a 125,000-unit year in 1955.

Industrial Sales by Mail

Are your salesmen having trouble showing your products to enough people on their calls? Try the jeweler's case technique being used by Set Screw & Mfg. Co., Bartlett, Ill.

Setko made up red plush-lined cases which display 27 of its headless screws and 5 different socket keys. The cases, about 10 x 12 x 2 in., are placed in a mailing packet and sent to prospects along with literature explaining the features of each screw and key. The prospective customer can show the merchandise to as many men as he likes. When he's finished, he mails the case back to Setko.



Air-conditioning system developed by Carrier Corp. is designed to be added to horizontal warm-air furnaces. Coil package is inserted in the ductwork at the discharge end of the furnace. Refrigerating device, requiring no water, is placed outside home

Contract manufacturing smooths profit-loss peaks as . . .

Butterworth Bucks Trend

CONTRACT MANUFACTURING can pay off as a specialty.

Many companies have been avoiding that type of work lately because of its supposed instability. But H. W. Butterworth & Sons Co., Bethayres, Pa., seeks it despite the trend among many metalworking firms to subcontract as little of their work as possible.

Reasons Why—Butterworth has just expanded to be more efficient in contract manufacturing for machinery builders. It believes the move can help stabilize its work load and its profits, give more steady employment to workers and assure for itself a good core of highly skilled help. Butterworth is confident the plan will pay off because it sees a market for that type of service and because it has the background, experience and facilities for it.

Primarily a designer and manufacturer of textile machinery—and a good one—its whole record, dating back to its founding in 1820, has been one of diversification, highlighted by contract work for private industry and government agencies. Five times since its founding, the company has turned over all facilities to produce materials for war.

Facilities — Butterworth's contract service has ranged in unit size from small precision assemblies up to 32,000-pound machined castings and has involved working with all materials of construction, including such special materials as plastics and precious metals. So this latest addition to its services is in no sense a remote step.

To round out facilities to be made available to machinery manufacturers who want to retain their own sales organization, Butterworth recently completed a plant addition and installed more than $300,000 worth of new machinery. The plant now has approximately 188,000 sq ft and is equipped with more than 1000 modern machine tools.

Clients — Says Butterworth's John H. S. Spencer, vice president and secretary: "The most recent of our contract jobs is with the Moore & White Co., Philadelphia, builder of papermaking machinery. Moore & White wished to continue its own sales, research and machine design organization. It was able to avoid a large capital expenditure for modern productive machinery."

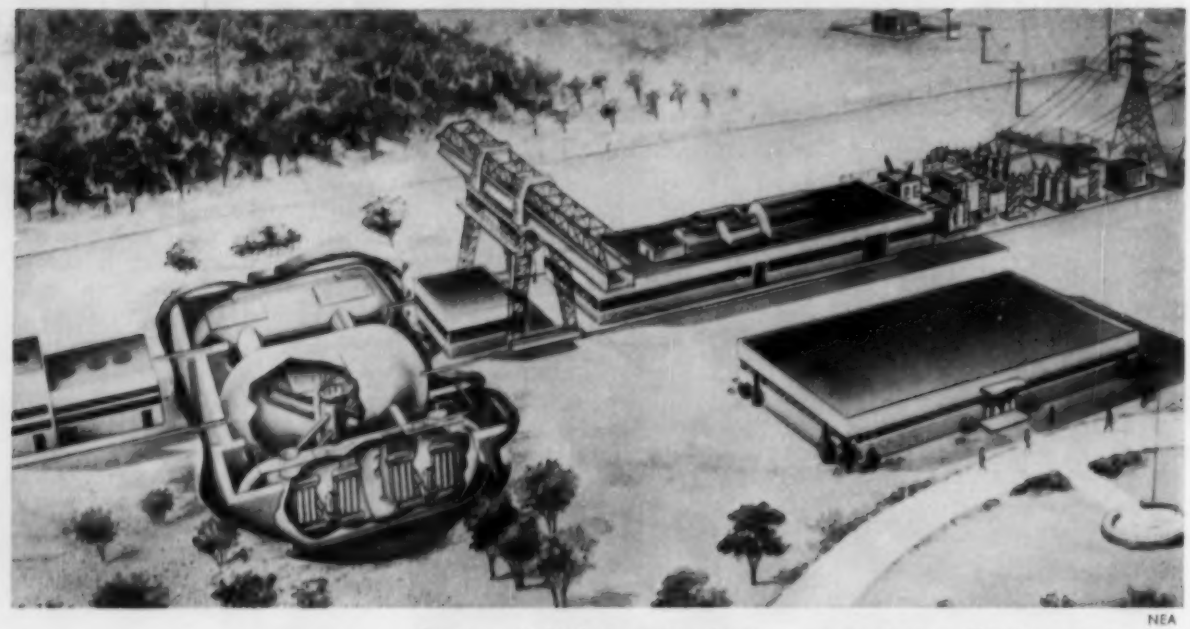
Other companies now being served by Butterworth include: American Cyanamid Co., American Machine & Foundry Co., Budd Mfg. Co., Celanese Corp. of America, Chrysler Corp., Dow Chemical Co., E. I. du Pont de Nemours & Co. Inc., General Motors Corp., Koppers Co., North American Aviation Inc., Rayon Consultants, Republic Aviation Co., Servel Inc. and Stokes Machine Co.

For this work Butterworth has highly developed services, involving tooling, machining, fabrication, stamping, welding and heat treating. In addition to manufacturing, the company provides engineering service if desired—such as design and consultation on mechanical problems.

Outlook — It will still push its lines of textile finishing machinery, spinning wheels for synthetic yarns and calender rolls for the textile and paper industries; also the contract manufacture of assemblies, sub-assemblies and components. But it has high hopes for its latest step.

"Butterworth's new contract manufacturing service for machine builders is no temporary venture," Mr. Spencer declares. "We entered this program with a definite purpose and we intend to expand in this direction."

By E. C. KREUTZBERG Washington Editor



NEA

Duquesne Light Co.'s proposed atomic power plant at Shippingport, Pa., includes (from left): Building for fuel handling, atomic reactor and heat exchangers, crane, turbo-generator building, switchyard and transmission lines

U.S. To Speed Atom Power

STUDY RECENTLY completed by the Atomic Energy Commission forms a basis for a program to help private industry develop atomic power.

For example, the government stands ready to furnish nuclear materials on a loan basis, to help in recovery of materials from spent fuel elements, to furnish free laboratory service and to enter into research and development contracts. The government will furnish assistance that should cut costs substantially for companies which undertake construction and operation of atomic reactors.

Firm Prices—Under this new program, applicants willing to assume risks in the construction, ownership and operation of atomic reactors will also receive from the commission firm prices for buying natural uranium, thorium and heavy water; and for leasing uranium 235, uranium 233 and plutonium.

The AEC will also establish prices which it will pay private industries for the nuclear material they produce, the price schedule being guaranteed for seven years.

Findings—So significant to the future of industry is the AEC power study that it is important that industry understands the basic findings. From the year of Christ's birth to 1860, world energy burn-up for all purposes was between 6 and 9 energy units (a unit is a billion billion Btu's). From 1860 to 1947, 4 energy units were used. During 1950, 0.2-unit was used. By 2000 the world will be burning something like 1 energy unit a year.

This great increase in demand certainly is not going to be satisfied from present sources. The AEC finds that energy recoverable from the world's fossil fuels is about 27.2 units, coal 21, oil and gas 5, oil shales and tar sands 1.2. In addition, water-power resources are limited, and such sources of energy as tides and sun rays have not been developed. It appears that fissionable materials may be the guiding light in meeting tomorrow's power needs.

Power Potential—As AEC looks at this picture, a pound of fissionable material derived from uranium can do the work of 1300 tons of coal, providing the energy can be controlled in a way comparable to coal. After only scratching the surface, we've found sufficient uranium for hundreds of energy units.

One of the problems involved in making atomic power feasible depends upon learning how much energy is obtainable from uranium, the abundant 238 isotope, as well as the rare fissionable 235. It is felt this problem will be solved as 238 can be transmuted into fissionable plutonium. Another consideration is the use of water as a coolant which prevents operation of reactors at the desired high temperatures and also acts as a powerful corrosive agent. There is also a need for coolants which will absorb a minimum of neutrons.

Distribution—An important factor brought out by the commission is that the cost of fuel is only a small part of electrical power cost to the consumer, the big cost being distribution. So higher-cost atomic power at the generating plant would not necessarily rule out atomic power.

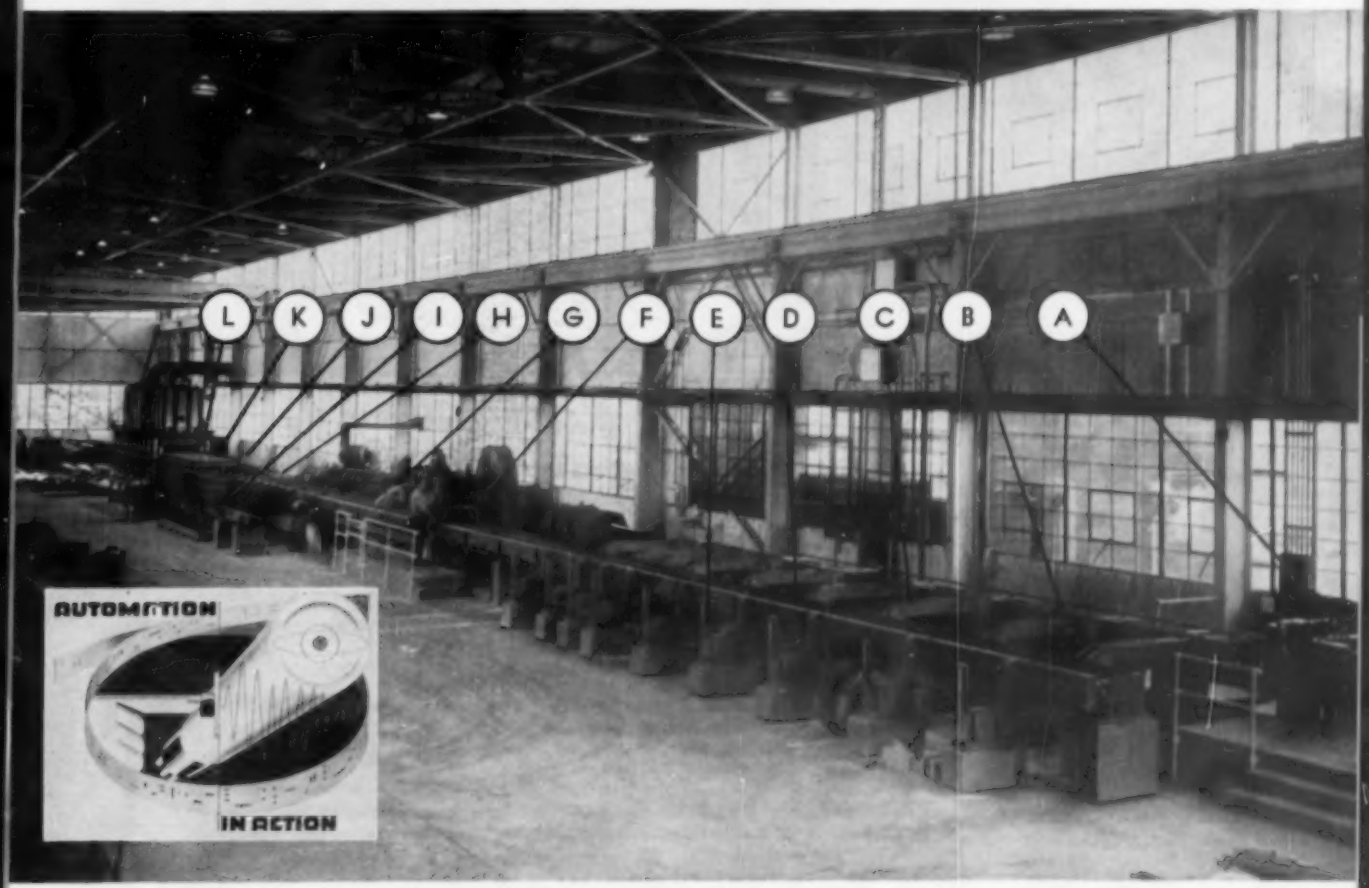
Here's the Fastest, Most Efficient Cold Draw Processing Line Available

The McKay Automated Line that automatically handles and processes hot rolled bars through cold drawing, shearing and straightening in a continuous cycle has proved itself to be far and away the fastest, most efficient cold draw processing operation in action today. Users are finding they can effect great labor savings while actually boosting production, and at the same time get a more uniform product.

Hot rolled, pickled bars are push pointed, drawn, sheared to length, and straightened in a single, continuous operation with no intermediate handling of any type. Hold down and crop gauging on a multiple shear, plus automatic length gauging, permits the shearing operation to keep pace with the maximum drawing cycle. Sheared bars are automatically entered into the straightener which operates at speeds high enough to enable a continuous straight-line flow of bars.

Does the line pay off? Three of four companies now using these lines say they have already paid for themselves and are contemplating the purchase of additional units.

CAN YOU AFFORD TO OPERATE WITHOUT SUCH COST SAVING EQUIPMENT? Remember handling adds nothing to the value of your product. Why not look over the McKay line of automated processing-handling equipment? Why not talk it over with a McKay engineer? There's no obligation.



A—**Hydraulic Push Pointer** Eliminates pointing prior to drawing. Minimizes point scrap.

B—**Multiple Bar Draw Bench** One, two or three bars at a time.

C—**Horizontal Pneumatic Transfer Arms** Takes drawn bars from bench and deposits them on driven shear entry table.

D—**Shear Entry Table** Conveys drawn bars to the shear.

E—**Auxiliary Racks**

F—**Multiple Bar Shear** Has capacity to shear same number and sizes of bars that are drawn.

G—**Cut-to-Length Gauge Table** Automatic cut-to-length and crop gauges.

H—**Shear Run-out Table** Driven table conveys sheared bars to straightener entry table.

I—**Transfer Skids** Entry to straightener table.

J—**Automatic Straightener Entry Table** Completely automatic feed from transfer skids into straightener.

K—**Straightener**

L—**Straightener Exit Table and Racks**

The McKAY MACHINE *Company*
YOUNGSTOWN, OHIO

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Torrington Sales Engineers do more than sell bearings. It's their job to help manufacturers gain the unique advantages of the Needle Bearing for their products. They've racked up over 500 years of application know-how in the time the Needle Bearing has been on the industrial scene. All of it is available to you.

A Torrington Sales Engineer applies considerably more than his own wide experience to your anti-friction problem. He also draws on the resources and personnel of our Engineering Department and its complete files of Needle Bearing case histories.

Each problem is different—yet all have a common core: how to provide high-capacity anti-friction performance in minimum space at low cost. The fact that the Needle Bearing has become "standard equipment" in so many well-known products is testimony to the knowledge and skill of our engineering staff. They'll literally go out of their way to help you with your problems. Just ask them.

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- full complement of rollers
- unequalled radial load capacity
- low unit cost
- long service life
- compactness and light weight
- runs directly on hardened shafts
- permits use of larger and stiffer shafts

Magcoa's McDonald: Man with a Mission

"IT'S A YOUNG INDUSTRY . . . and to push its growth it takes young aggressive engineers who aren't hidebound by preconceived notions of what can and can't be done with metal."

That's the way Nolan E. McDonald of Magnesium Co. of America, E. Chicago, Ind., describes impact extruding. But to his associates, the description fits the man and the philosophy by which he manages Magcoa's impact extrusion department.

Midnight Oil—Only 34, Mac McDonald took his formal education practically on the run—much of it in night school. "Although I have enough credits for a doctor's degree, I never earned a college degree," he explains. "I took courses which I thought I'd need, but they never fulfilled degree requirements."

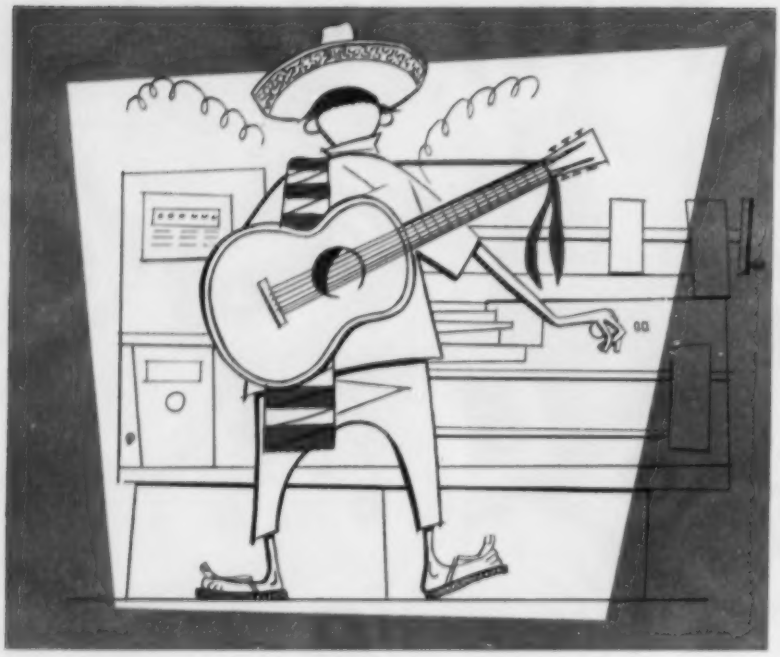
His industrial experience includes: Assistant general foreman for an electric motor and appliance maker, general foreman in a large can company, design engineer for an asphalted building products manufacturer and design and development work for two large aluminum companies in their impact extrusion departments.

Changeover—For the building products firm, Mr. McDonald was responsible for changing what was essentially a hand production process into a completely automatic operation at one plant and then was in charge of the building and equipping of a brand new plant. He left the company because he "couldn't see enough future there for me." After eight years with the aluminum companies, Magcoa offered the future he was looking for: "A comparatively small, but aggressive company working with all extrudable metals and located in an area surrounded with tremendous market potential."

"Impact extrusions have just scratched the surface for applications in industry," says Mr. McDonald. These extrusions will find wide use in the auto, appliance, electronics, aircraft and other industries. Illustrating his enthusiasm for the future of impact extrusions, Magcoa officials say that it's not unusual to see a light burning at 2 a.m. in the extrusion department and to find Mac and an engineer or two experimenting with a new product or process.

Challenge—Mac's biggest challenge, his associates relate, is the comment that "it can't be done by impact extruding." Recently a defense contractor brought in a magnesium part that was being machined at considerable cost. Mac and his engineers went to work. The result: The part, which has five different side wall thicknesses, is being produced by Magcoa with just one "smack" of an extrusion press.

It's this type of job that spurs Mac and his engineers—all but one are under 40—into action.



Pancho moves from hacienda to factory as . . .

Mexican Industry Gains Foothold

THE SMOG over Mexico City is getting thicker. Locked in by the surrounding montains, it's reminiscent of the plague that settles over Los Angeles.

The smog is indicative of what is happening in Mexico and what could happen. It makes our big neighbor to the south one to watch. One day it could be as important to the U. S. and U. S. metalworking as Canada to the north.

Up and Up—Mexico City now has 3 million people. It's as big as Detroit or Berlin and still growing. New buildings are rising everywhere. They include hotels, parking garages, office buildings, factories, a baseball park and a huge new Sears-Roebuck store in the suburban area. Ancient lava beds at the edge of the city are being invaded by palatial and sparkling residences of Mexican design.

Even a group of German engineers has arrived to help solve the problem of the sinking lake bed on which much of Mexico City rests. For buildings have the distressing tendency to settle in the soft soil at grotesque angles.

Still Poor—Let there be no impression that Mexico has attained sudden opulence. For, outside a handful of large cities, it is a poor, squalid country where the burro, 5-gallon gasoline can and the machete are prized possessions.

But these things are happening:

Irrigation—Along Mexico's western coastal plain from Tepic on the south to Guaymas on the north, there's an explosive development. Two big irrigation projects have been completed. Two more are on the way. Many hundreds of thousands of acres are becoming available to provide the bread basket for underfed Mexico and perhaps an exportable surplus.

Railroads—The decrepit coastal railway to Guadalajara has been acquired from the Southern Pacific by the government. Already $15 million has been spent or committed for rehabilitation. The Export-Import Bank and International Bank for Reconstruction have just authorized loans of $5 million and $61 million, respectively.

Ports—A group of engineering consultants from the Netherlands who rebuilt the Port of Rotterdam has completed a study of Mexican ports and its transportation system. Twenty-seven per cent of the Mexican national budget in 1955 has been set aside for improvement of communications. Mexico sorely needs an expanded road system. Republic Steel's rutile properties at Pluma Hidalgo now are virtually inaccessible except in the dry season by jeep.

There are two sacred cows in Mexico—oil and iron ore. The country has no coal except in the Sabinas basin in the north, so it needs its oil. Getting an export license for iron ore is almost prohibitive.

Petroleum Potential—The Juarez oil field near Tecolutla and north of Veracruz may prove important. A 2000-barrel-a-day well came in under high pressure. This field could be tied in with the network of lines serving Tampico. In ten years, production is up to 230,000 barrels a day from 170,000.

To the south, Fluor Corp. is working with Pemex, the Mexican oil monopoly, to rebuild the Minatitlan refinery. A newly completed oil products line across the neck of the Mexican isthmus to Salina Cruz will make fuel available to the West Coast and, incidentally, for Republic's diesel power plant.

Government Control—Just west of the mouth of the Rio Balsas on the West Coast, three mountains have 10-20 million tons of high grade iron ore. Bethlehem Steel Co. once was interested but the properties now are in the hands of the federal mining reserve. Republic has done exploratory work near Veracruz.

Substantially all of the iron ore produced in Mexico comes from the Cerro de Marcado mine at Durango. It's owned by Compania Fundidora de Fierro y Acero in Monterrey and runs 62-63 per cent iron content. Fundidora takes 50,000 metric tons a month for its two blast furnaces. Another 30,000 tons go to Altos Hornos de Mexico at Monclova and 20,000 tons are exported to Sheffield Steel Corp. at Houston.

More Steel—The Mexican steel industry is small but growing. Last year it produced 600,000 tons—mostly merchant bar products, plates, structurals and sheets. This

is supplemented by 200,000 tons brought in from the U. S.

By late 1955, Fundidora will have a new merchant mill built by Lewis Foundry & Machine Co. and financed by a $3.5-million Ex-Im bank credit. Altos Hornos de Mexico at Monclova, in which Armco has an interest, will have a new electrolytic tin plate line this year.

Promising—Being watched from this side of the border is the technically successful sponge iron operation of Hajalata y Lamina at Monterrey. Finely ground ore is mixed with coke breeze and passed through a tunnel kiln. The material is gradually brought up to top heat, then reduced in temperature. The carbonaceous material reacts with iron oxide to produce iron. Hajalata also has a $3.5-million Ex-Im credit.

The Mexican government currently seems bent on improving the income and raising the living standards of its people. That will require restoring confidence in its currency and encouraging foreign investments through re-examination of its tax structure.

High Taxes — The U. S. probably will prevent the peso from slipping below eight cents. But, the principle of taxation still is based on production, not profit. Taxes take out as much as 35 per cent of the gross value of a product. Export taxes are applied liberally.

Oil companies can operate only under contract with the Mexican government. They get 50 per cent of the value of the product until costs are covered, plus 15 per cent as profit. Then they are limited to 15 per cent. Losses are on the company.

Larger U. S. companies have sales agencies or distributors in Mexico. Some, like General Motors, have assembly plants. There's a fair sprinkling of new, branch manufacturing plants. As Mexico succeeds in putting extra money into the pockets of its people, there will be more.

Discount Structure Revised

Major revision of General Electric Co.'s marketing structure on polyphase induction motors in the 1 to 200-hp range went into effect Jan. 3.

Purchaser discounts have been revised to lower net prices approximately 6 per cent.

Management salaries rise some 5% a year, and . . .

Bosses' Pay Up 23.5% Since '49

EXECUTIVES in American business are sharing in the country's general prosperity, although their incomes have not gone up as much in most cases as the profits of the corporations they serve.

Over the last five years, according to the results of an American Management Association survey, the average aggregate compensation of all officers and directors of corporations increased 23.5 per cent. During the same period, company profits after taxes went up 28 per cent on the average, with sales increasing approximately 60 per cent.

Background—The report is based on an analysis of payments to nearly 20,000 executives in some 2,500 companies. These companies are classified into 53 major industries and 10 size groups with annual sales ranging from less than $2 million to more than $1 billion. Period covered by the report was essentially in 1953 but extended to July, 1954, for companies whose fiscal year ended then. Statistics gathered included bonuses and company contributions to retirement funds as well as salaries.

Going Up—Compensation to executives was 4.2 per cent higher in 1953 than in 1952, while bonuses were 6.8 per cent higher. However, because of differences in business conditions for individual firms, the reported trend in "average" compensation is not necessarily indicative of what actually happened in specific companies or industries.

Over the five-year period, increase in executive pay for specific industry groups ranged from 8 to 29.4 per cent. Smallest increase was reflected in the wholesale and retail trade while largest gains were registered by utilities.

Although certain years were better than others, increases from 1948 through 1953 averaged about 5 per cent per year. Pay to the men who make the decisions in business, therefore, was less than the maximum permitted under the salary stabilization regulations which are no longer in effect.

The current report expands the management salary fees survey to include more than 11,000 executives in 13.5 companies and provides detailed information on about 50 industries.

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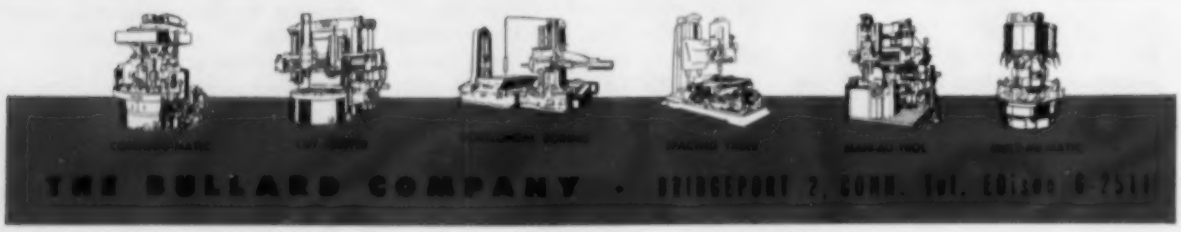
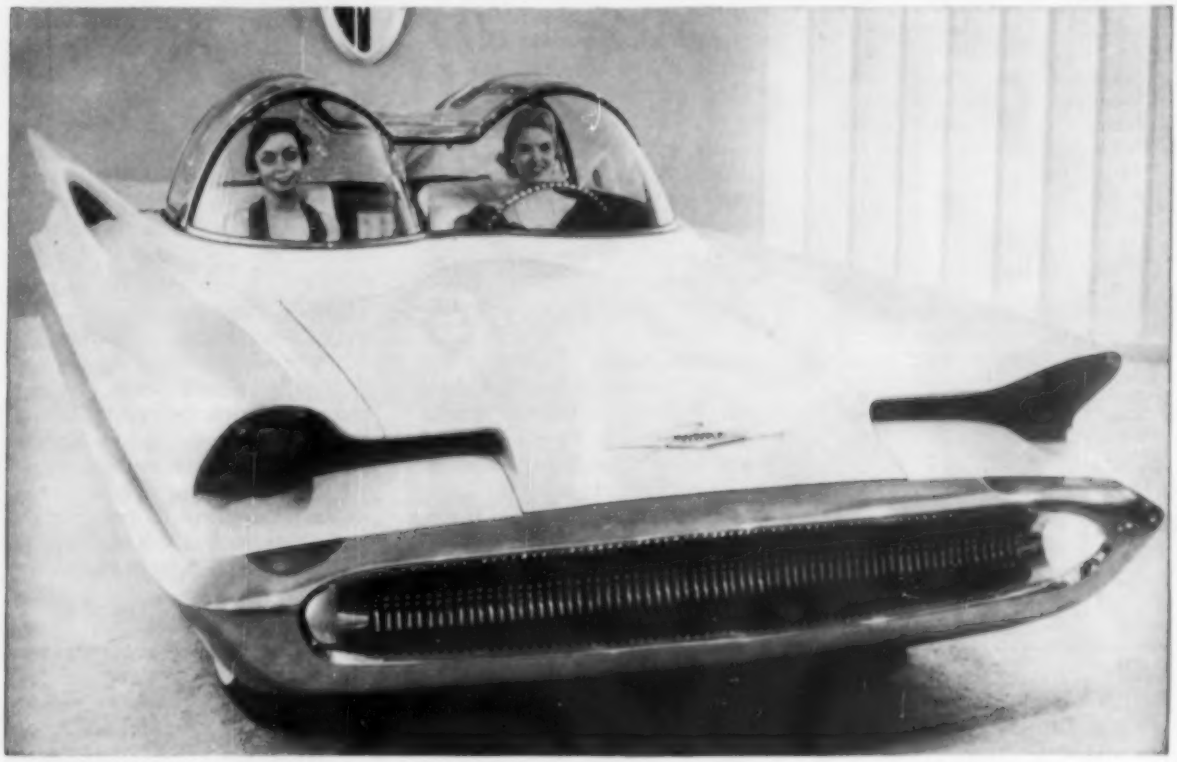


By FLOYD G. LAWRENCE *Detroit Editor*



Lincoln-Mercury's dream auto and other makers' offerings hint . . .

What the Car of the Future Will Be Like

THIS IS THE TIME of year for the car of the future.

Annually, Detroit sends up these style balloons in the hiatus between new-model introductions and natural interest in new cars in the spring to lure people into auto shows where conventional cars are on display as well.

More than Hint — But these three-dimensional doodlings also advise people of what progress is, so they will recognize it when next year's cars are introduced in the fall. Bristling with features already being tooled, the style balloon can't miss on predicting some aspects of the car of the future.

Taking a look at the car of the real future is a completely different matter as engineers who grappled with the problem at a recent SAE meeting in Detroit admit. Their basic problem: Cars are designed to meet conditions of highways and living generally, and nobody is sure what those conditions are going to be.

Relying on Roads—Even so, engineers do agree on some items. Most feel that the country will be spanned with expressways in the not-too-distant future. With the roads known, some concrete predicting is possible.

Retaining about the same basic length and width, the car of the future will be lower. To accomplish this, engineers agree a leveling suspension to compensate for varied loads must be universal. (See STEEL, Dec. 20, p. 55.) They also agree that the drive shaft will be eliminated to permit removing the drive-shaft tunnel for further lowering.

Front-wheel Drive — Although Maurice Olley, Chevrolet director of engineering and research, declined commenting on precisely how this might be accomplished, one answer is provided by the front-wheel drive truck of the future (p. 54). Front-wheel drive, although presently considered expensive, has been used on the Citroen made in France since the early 1930s, and was used on the Cord here.

On American cars, the big advantage would be putting the traction under the weight of the engine and associated powerplumbing. Engineers tend to agree that the directional stability of the rear-engined car at high speeds is inferior to that of the front-engined machine.

Functional Fin—Directional stability, now no small problem, will be amplified by tomorrow's cars which will cruise at speeds of 100

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Auto, Truck Output

U. S. and Canada

	1954	1953
January	594,778	614,000
February	573,801	628,017
March	672,485	752,149
April	676,248	782,491
May	621,262	684,843
June	623,732	713,778
July	543,540	756,592
August	523,799	640,186
September	364,441	605,228
October	312,078	651,153
November	616,395	458,567
December	762,209†	529,588
Total	6,884,768†	7,816,592

Week Ended	1954	1953
Dec. 18	180,087	132,093
Dec. 25	149,418	92,247
	1955	1954
Jan. 1	148,436	93,293
Jan. 8	177,877	152,418
Jan. 15	183,572	149,841
Jan. 22	182,000*	146,741

Source: Ward's Automotive Reports. †Preliminary. *Estimated by STEEL.

mph and up on expressways. Rudimentary fins introduced as styling features will grow to functional significance to assist keeping the car pointing in the intended direction.

Engineers agree that aerodynamics will play an increasingly important role in the design of cars to come. Streamlining may even come back.

The Loewy View — Raymond Loewy hopes so. He leveled a blast at today's cars as an "orgiastic chrome-plated brawl."

Betting a chrome-plated carrot that frustrated automotive stylists have the highest rate of duodenal ulcers, Mr. Loewy went on to envision his car of the future as dependent on these six major factors: The future state of the nation's economy; the nature and cost of available fuel; the rate and radius of decentralization of population; the development of new materials, methods and techniques; the development of more compact power plants; and the possibility of a highway system with a resilient or some other quality surface.

Coming Up—Isolating the factors he considers near certitudes, Mr. Loewy predicts their effects. Better streamlining, smooth undercarriage and strength in case of collision he sees coming. The engine, being small, does not require a high hood and can be placed anywhere. The body encloses large luggage spaces. The car will move laterally for close parking.

Seats will include a pneumatic network to control resiliency. The steering wheel will be mounted on a telescoping column or will be replaced by a lever not aimed at the driver's chest. A low-priced radar unit will have been developed for driving in fog.

Characteristics — Other engineers believe a means of automatic control to take over on expressway driving will have been developed. H. E. Chesebrough of Chrysler Corp. predicts that an electromagnetic device will guide the car down tomorrow's superhighway; coupled with an approach warning system front and rear, it will take over the passing of other cars.

How do we get from where we are today to there? Plenty of things will be happening in the next five or ten years.

Air Conditioned — Roll-up windows, for example, are going to pass from the scene. They will be replaced with windows flush with the exterior of the car to reduce wind noise now contributing to driver fatigue at high speed on long trips. Air-conditioning systems will ventilate the car and control the temperature, regardless of heat or cold outside.

There's a good rumor that the 1956 Studebaker will have torsion-bar suspension like the 1955 Packard and that other makes will go to air-level ride in 1957. By 1958, interconnected suspension should be virtually universal in the industry. Front-wheel drive may have started to come in by that time as well.

Turbine Ahead—A GM division engineer has just completed work on a dream engine utilizing a V-8 135-degree aluminum-alloy segmented block with double overhead cams, magnesium gear covers, fuel injection and delivering 200 hp on a compression ratio of 8 to 1. He reports that features from this dream engine will be incorporated in tooling the last V-8 for his division before the turbine takes over.

It is reported that Packard will be announcing a turbine before long which does not require expensive alloys in its construction. The next ten years will see the gas turbine entering the automotive field in quantity.

Whether your ideas of the car of the future agree with those of the experts, one prominent fact stands out: In engineering, materials and processes, the auto industry promises to progress further in the next 15 years than it has in the last 50.

GMC's panel delivery, L'Universelle, will be shown in GM Motoramas this year

CATERPILLAR NOW USES LEDLOY* 5120

Saves on Every Pre-combustion Chamber Assembly

In today's competitive market, any savings on a component is important, even on a product as large as the Caterpillar D8 crawler Tractor. Caterpillar Tractor Co., with an eye on costs, selected Ledloy 5120 for pre-combustion chamber assemblies in their diesel engines. As a result, machining costs have been reduced on each of the two parts that form the finished assembly. This reduction resulted from Ledloy's free machining properties, which reduced machining time and increased tool life.

Design called for copper brazing the two pieces together and nickel plating the entire assembly. *The Method:* The leaded steel was brazed and plated in the usual way, without special handling. *The Results:* Pre-combustion chamber assemblies made of Ledloy 5120 at a lower cost, met all requirements and are seeing service in Caterpillar-built machines around the world.

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Two component parts of the Pre-combustion Chamber assembly were machined from Ledloy 5120 cold drawn bars. Other leaded alloy steels and leaded carbon steels are available in all standard or S.A.E. compositions in any of our standard sections. Write for complete information about application of leaded steels to your product.

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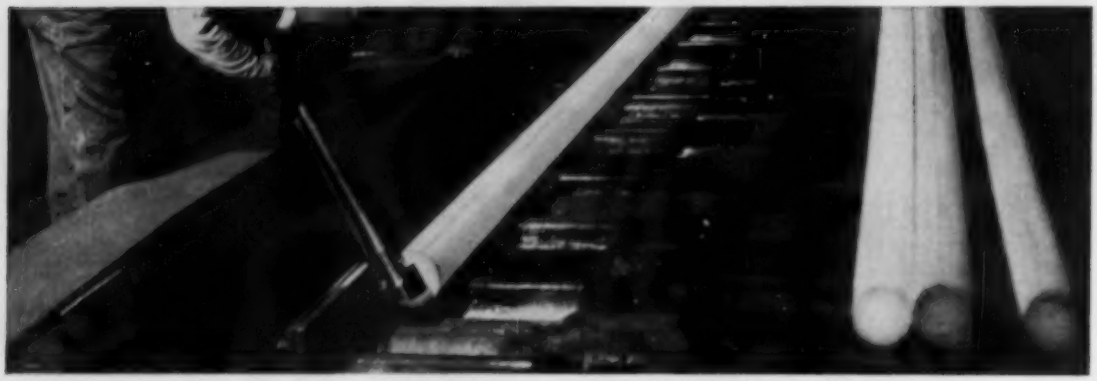

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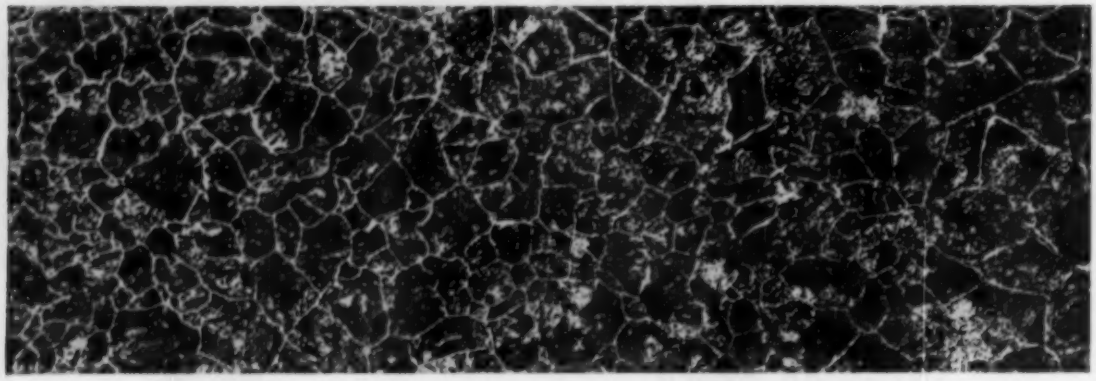

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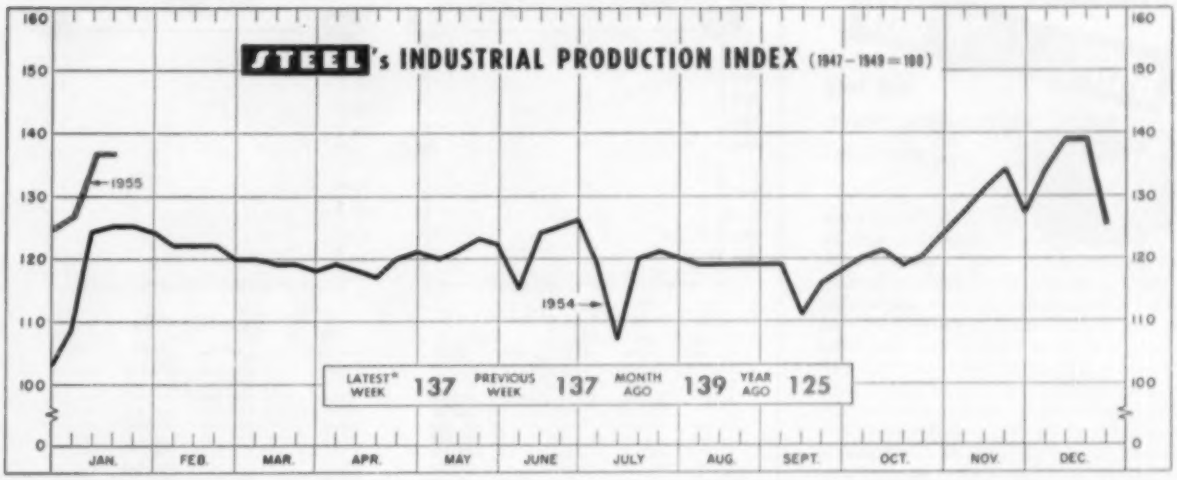
YEARS AHEAD—THROUGH EXPERIENCE AND RESEARCH

SPECIALISTS IN FINE ALLOY STEELS, GRAPHITIC TOOL STEELS AND SEAMLESS TUBING



*Week ended Jan. 15. Based upon and weighted as follows: Steel Output 35%; Electric Power Output 32%; Freight Car Loadings 22%; and Auto Assemblies 11%

Ike's Budget Points Dollars at Metalworking

METALWORKING can look for a slightly larger share of federal government spending in fiscal 1956. That's the outlook now, dependent, of course, on how respectfully Congress treats President Eisenhower's proposed budget.

Most of metalworking's gain will come from defense work, which is allotted 65 per cent of $62.4 billion the President is asking for. Expenditures for hard goods will account for some 35 per cent of military spending, up about $100 million from the estimate for fiscal 1955.

Ups and Downs—The Air Force will get the lion's share of defense funds, almost as much as the Army and Navy together; so the aircraft industry can look for continuing good times. Shipbuilding is due for a boost. Cutbacks are planned in buying of electronic equipment, support vehicles and artillery ammunition.

General Services Administration stockpile spending will be lower in the coming year by about $200 million. Requested is $783 million, compared to $994 million this year. But another $100 million is asked for the Defense Department's machine tool reserve. Increased foreign aid is sought, over $3.5 billion for military goods and another $1 billion for other programs.

More Air Power — Behind the Air Force appropriation is a goal of 130 wings by the end of fiscal 1956. That's nine more than we have and would put ahead of schedule the program aiming at 137 wings by 1957.

Some $7.6 billion is earmarked for aircraft procurement, some $7 million under last year. But the buying will take on a new look. There will be more interceptors, heavy bombers and large transports, fewer fighter-bombers, light and medium bombers and smaller transports.

Fewer Planes—The emphasis on larger, more expensive planes will account for an expected drop in the number of aircraft delivered.

BAROMETERS OF BUSINESS

	LATEST PERIOD*	PRIOR WEEK	YEAR AGO
INDUSTRY			
Steel Ingot Production (1000 net tons)[2]	1,989	2,007	1,766
Electric Power Distributed (million kwhr)	9,805[1]	9,833	9,014
Bitum. Coal Output (1000 tons)	8,500	7,430	8,190
Petroleum Production (daily av.—1000 bbl)	6,450[1]	6,574	6,333
Construction Volume (ENR—millions)	$364.7	$414.9	$195.8
Automobile, Truck Output (Ward's—units)	183,572	177,877	149,841
TRADE			
Freight Car Loadings (unit—1000 cars)	608[1]	602	620
Business Failures (Dun & Bradstreet, no.)	206[1]	198	200
Currency in Circulation (millions)[3]	$30,196	$30,434	$30,284
Dept. Store Sales (changes from year ago)[3]	+13%	−1%	+6%
FINANCE			
Bank Clearings (Dun & Bradstreet, millions)	$18,907	$22,170	$18,396
Federal Gross Debt (billions)	$278.5	$278.8	$274.9
Bond Volume, NYSE (millions)	$25.7	$31.2	$26.7
Stocks Sales, NYSE (thousands of shares)	17,369	22,946	7,590
Loans and Investments (billions)[4]	$85.8	$86.5	$80.8
U. S. Gov't. Obligations Held (billions)[4]	$36.5	$36.9	$32.9
PRICES			
STEEL's Finished Steel Price Index[5]	194.53	194.53	189.74
STEEL's Nonferrous Metal Price Index[6]	216.9	215.8	205.7
All Commodities[7]	110.1	109.6	110.9
Commodities Other Than Farm & Foods[7]	114.8	114.8	114.5

*Dates on request. [1]Preliminary. [2]Weekly capacities, net tons: 1955, 2,413,278. 1954, 2,384,549. [3]Federal Reserve Board. [4]Member banks, Federal Reserve System. [5]1935-1939 = 100. [6]1936-1939 = 100. [7]Bureau of Labor Statistics Index, 1947-1949 = 100.

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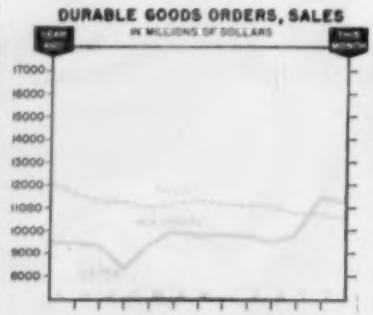
THE BUSINESS TREND

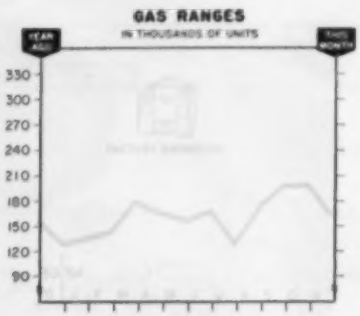


In Millions of Dollars*

	New Orders		Sales	
	1954	1953	1954	1953
Jan.	8,475	12,454	11,580	12,508
Feb.	9,629	12,416	11,278	12,666
Mar.	10,206	12,520	11,385	13,116
Apr.	10,021	12,702	11,502	13,398
May	10,050	13,101	11,344	13,148
June	9,985	12,392	11,395	13,166
July	9,700	11,600	11,287	13,410
Aug.	9,978	10,139	10,952	12,730
Sept.	11,699	10,110	10,947	12,698
Oct.	11,506	9,677	10,789	12,376
Nov.	.....	9,631	.....	11,867
Dec.	.....	9,567	.....	11,576

*Seasonally adjusted, U. S. Office of Business Economics.

Charts Copyright 1955 STEEL.



Shipments—Units

	1954	1953	1952
Jan.	137,000	169,200	166,100
Feb.	152,900	185,900	166,200
Mar.	188,200	208,200	185,200
Apr.	172,400	220,300	182,300
May	163,800	181,000	162,800
June	174,300	166,600	175,700
July	134,500	159,000	154,200
Aug.	179,400	186,800	178,600
Sept.	203,900	209,500	199,600
Oct.	206,700*	203,900	239,700
Nov.	170,500*	158,500	186,400
Dec.	.....	134,400	178,600
Total	.....	2,183,300	2,175,400

Gas Appliance Mfrs. Assn.
*Preliminary.

from 7,000 in 1955 to 6,000 in 1956. Another kind of flying machine, the helicopter, is due for even more attention from the Army.

Tied in closely with aircraft is the guided missile program which will rise about 30 per cent. Spending this year for missiles is estimated at $519 million; next year $675 is requested.

Shipyard Relief — The hard-pressed shipbuilding industry should get some relief from a program designed to give the Navy a fifth aircraft carrier of the *Forrestal* class costing about $180 million. Also projected are three more atomic subs at somewhere above $50 million each. All told, ship construction will be about $1 billion, up $110 million from 1955. The Maritime Administration will spend about $195 million to support construction and modernization of the Merchant Marine.

Atoms: More Uses Ahead . . .

The Atomic Energy Program will lose little steam over a $50-million drop in funds. The decrease is accounted for by a sharp drop in atomic energy plant construction.

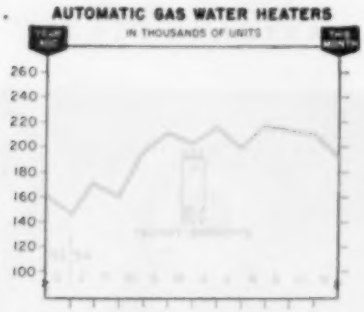
Actual AEC operating expenses in fiscal 1956 will be up, reflecting increased procurement of uranium ore and higher output at AEC plants. Due for stepped-up activity is work on industrial power reactors. It's part of a plan to assist industry to achieve economical power generation from atomic reactors.

More study will go into atomic-powered aircraft, as well as a search for better nuclear power plants for subs and larger ships and small portable reactors for military use.

Tax Cuts on the Horizon . . .

Chances are that at least the military part of the budget will be approved without much change. Severe cuts are unlikely; increases are quite possible as some Congressmen think defense spending is falling behind what is needed to maintain national security. Another possibility is the juggling of funds to boost the allotments of the Army and Navy.

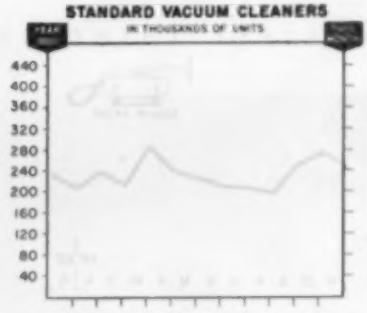
The President based his budget on hopes that present tax scales would be extended past April 1 when some cuts are due. And chances are that those hopes will be realized. But there is a definite indication that the tax cuts will come a year from now, when the



Shipments—Units

	1954	1953	1952
Jan.	164,400	184,000	148,700
Feb.	175,000	188,500	145,800
Mar.	187,800	203,000	153,300
Apr.	200,800	204,400	155,300
May	195,600	179,000	153,300
June	206,700	175,800	159,000
July	190,300	173,800	131,300
Aug.	207,100	163,000	161,500
Sept.	205,500	175,300	171,200
Oct.	202,000	189,200	185,300
Nov.	185,200*	151,900	167,100
Dec.	.....	137,800	178,600
Total	.....	2,125,700	1,910,400

Gas Appliance Mfrs. Assn.
*Preliminary.



Sales Billed—Units

	1954	1953	1952
Jan.	221,233	255,886	223,357
Feb.	199,035	246,007	230,226
Mar.	276,464	329,294	290,092
Apr.	220,849	268,548	217,169
May	209,434	252,404	216,969
June	195,781	197,506	206,939
July	193,607	159,446	188,715
Aug.	185,397	188,536	222,413
Sept.	238,285	227,253	237,541
Oct.	263,197	249,383	292,474
Nov.	237,882	216,227	254,297
Dec.	.....	190,773	249,032
Total	.....	2,781,263	2,841,803

Vacuum Cleaner Mfrs. Assn.

expected extension would run out.

For example, in fiscal 1955 budget receipts from corporate income taxes are estimated at $18,466 million. But for fiscal 1956, those receipts are estimated at $17,034 million. That drop could mean two things: Business in fiscal 1956 is going to be poorer than in 1955; taxes will be cut. Though both are possible, the latter is more likely.

Reinforcing that conclusion are estimates for other kinds of federal income. In the first place, individual income taxes are expected to be up to $32.5 billion. That will be a gain of almost $2 billion over what's expected in fiscal 1955.

Excise taxes likewise are expected to bring in more: $9350 million compared with $9073 million this year. Also rising are employment tax (Social Security, etc.) receipts which will bring in more than $1 billion over this year's estimated $6080 million.

Building Sets the Pace . . .

Included in government-spending plans are highways, housing and schools, though the money for them may be raised in ways that won't add directly to the still rising federal debt.

That spells continuing good times in the construction industry which is getting along pretty well as is. In the latest week reported by *Engineering News-Record*, heavy construction contracts amounted to $365 million, pushing the total for the first two weeks of 1955 to 85 per cent ahead of the same period of a year ago. The two-week total is, in fact, an all-time record.

Private mass housing, industrial building and state and local awards paced the transactions.

Production Rises Slowly . . .

To look backward for a moment, industrial production closed out 1954 on a rising tide. For December the Federal Reserve Board's seasonally adjusted index gained a point to 130. That's 5 points over the average for the year of 125 but still under 1953's monthly average of 134.

Durable goods got a good share of the December raise. Auto production was a strong plus factor, and household durables held steady at about one-fourth above the low rate of late 1953. Producers' and military equipment held steady but failed to regain any of the ground lost last summer.

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Balls

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MIDDLETOWN, OHIO

FASTEST THING IN FASTENINGS®

"New twist" cuts assembly costs 63% on Awnair Adjustable Awnings

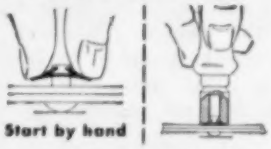
How to assemble adjustable awnings faster, easier and at lower cost? This 3-way challenge was met recently by engineers of the Awnair Corporation of America, Wayne, New Jersey. Playing leading roles in this success were Tinnerman SPEED NUTS!

Standard Push-On type SPEED NUTS were recommended for eight fastening applications. And three specially developed SPEED NUT brand fasteners put a "new twist" in the awning adjusting mechanism. They provide lightning-fast, rust-resistant, rattle-proof attachments. They also eliminate costly sawing, drilling, tapping, clinching and sanding operations.

The use of SPEED NUTS resulted in a 63% average assembly cost saving over former fastening methods, including a big 88% saving on one application!

Your Tinnerman representative will be glad to help you locate fastening savings in your product assemblies. Ask him for complete details on our Fastening Analysis Service!

PUSH-ON SPEED NUTS®



. . . zip over integral studs, rivets, tubing, or other unthreaded parts; bite into smoothest, hardest surfaces—lock with firm spring tension on metal, plastic or wood. Eliminate costly inserts in plastics; save machining of die castings!

Write today for your copy of the new Tinnerman Fastening Analysis Service Bulletin No. 336:

TINNERMAN PRODUCTS, INC., Box 6688, Department 12, Cleveland 1, Ohio. *In Canada:* Dominion Fasteners, Ltd., Hamilton, Ontario. *In Great Britain:* Simmonds Aerocessories, Ltd., Treforest, Wales. *In France:* Aerocessoires Simmonds, S. A.—7 rue Henri Barbusse, Levallois (Seine).

JAMES O. WRIGHT
. . . Ford Motor purchasing dir.

James O. Wright succeeds **Charles H. Carroll** as director of purchasing, **Ford Motor Co.**, Dearborn, Mich. Mr. Carroll, retiring at his own request, agreed to remain with the company for an indefinite period as a member of the staff of D. S. Harder, vice president-manufacturing. Mr. Wright, since June, 1953, has served as assistant general purchasing agent, Ford Division.

Theodore O. Rudd succeeds **C. R. R. Harris** as president of **Kerite Co.**, New York. Mr. Harris becomes chairman of the board and chief executive officer, and retains the post of treasurer. Mr. Rudd has been vice president since 1945 and a director since 1946.

A. R. Gaus was elected vice president, **Erie Forge & Steel Corp.**, Erie, Pa. He was previously vice president, Midvale Co., and with that concern over 20 years.

Harold E. Hasemeyer was elected vice president-production, **Electric Auto-Lite Co.**, Toledo, O., succeeding **Byron A. Fay**, retired.

John D. Russell, former manager of engineering, was made vice president-engineering, **Joy Mfg. Co.**, Pittsburgh.

G. C. Mitchell was made staff executive of **Chrysler Corp.'s** central purchasing department at Detroit.

HAROLD LEEVER
. . . president of MacDermid Inc.

Harold Leever was elected president of **MacDermid Inc.**, Waterbury, Conn. He has been executive vice president.

P. O. Peterson was elected president and chief executive of **Mack Trucks Inc.**, New York. **E. D. Bransome**, former president and chairman, continues in the latter position. Mr. Peterson was executive vice president, Studebaker-Packard Corp.

A. L. Coulson was appointed sales manager, **Ford Instrument Co.**, division of Sperry Corp., Long Island City, N. Y.

Elmer M. Pearson was made superintendent of steel conservation and quality control at **Republic Steel Corp.'s** Chicago district steel plant.

Paul E. Grube was appointed plant manager, **Columbia Steel & Shafting Co.**, Pittsburgh. **H. B. Reno Jr.** was made purchasing agent.

At **Sharon Steel Corp.'s** Niles Rolling Mill Division, Niles, O., **Grant H. Helwig** was named plant superintendent, and **William Howell** was made executive staff assistant, a new post.

Edward D. Bickford was appointed manager of sales, Cleveland district, **Bethlehem Steel Co.** He succeeds **R. W. Kempsmith**, retired.

WILLIAM E. JONES
. . . Josam Mfg. works mgr.

William E. Jones was made works manager of **Josam Mfg. Co.**, Michigan City, Ind. He is responsible for operating the foundry and machine shop in addition to other departments.

Gerald M. Hatch succeeds **Walter L. Brough**, resigned, as chief engineer for **Republic Steel Corp.'s** Union Drawn Steel Division, Massillon, O. **Calvin H. Windle** was made superintendent of Republic's cold strip department, Warren, O., district steel plants. He succeeds **J. W. McMahon**, cold mill superintendent since 1928, whose duties are being lightened. **Louis Hollis** was made assistant superintendent, cold mills.

C. W. Weiland was appointed purchasing director of **Fasco Industries Inc.**, Rochester, N. Y., to succeed **G. J. Andres**, resigned.

J. Bruce Butler of St. Louis was elected chairman and chief executive officer of **Mississippi Valley Structural Steel Co.**, Decatur, Ill. He has served as president and is succeeded in that position by **E. T. Blix** of Chicago, former executive vice president. **R. D. Wood** retires as chairman but will serve as a member of the board and of the finance committee.

Paul D. Sullivan was made assistant sales manager of Westing-

H. RICHARD FORD
. . . Pace Corp. sales mgr.

H. ROY BUTTS
. . . joins Johnson Bronze Co.

ROBERT D. BARRON
. . . National Radiator plant mgr.

house Air Brake Co.'s **Le Roi Division**, Milwaukee.

H. Richard Ford was appointed sales manager of **Pace Corp.**, Detroit. For the last seven years he has served as a manufacturers' representative, and prior to that was with Ford Motor Co.

Anthony Lebesch was promoted to works manager of **Allis-Chalmers Mfg. Co.'s** West Allis, Wis., Works' foundries and pattern shops. He succeeds **Harry E. Ladwig**, who was named foundry consultant.

Bohn Aluminum & Brass Corp., Detroit, appointed **Louis Sirotkin** as metals buyer. He was formerly with Federated Metals Division, American Smelting & Refining Co.

National Electric Welding Machines Co., Bay City, Mich., elected **Edward C. Smith** president; **William L. Mueller** and **Howard C. Cogan**, vice presidents; **Charles E. Shearer**, secretary-treasurer; **Simon Fisher**, general manager; and **Dean L. Knight** plant manager.

John LeBolt was named a vice president of **Cromwell Paper Co.**, Chicago, in charge of research. For the last five years he has been director of technical sales.

Eugene Caillet was appointed assistant manager of molded and extruded goods sales at **Goodyear Tire & Rubber Co.'s** St. Marys, O., plant.

H. Roy Butts, formerly sales manager, Electric Auto-Lite Co., joined **Johnson Bronze Co.**, New Castle, Pa., as vice president-sales.

Raymond W. Wiehsner was appointed sales manager, **Tabor Mfg. Co.**, division of Turbo Machine Co., Lansdale, Pa.

Philip F. Thayer was elected vice president, **General Metals Corp.**, San Francisco, and appointed general manager of its metals division, operating foundries, forge and pipe fitting plants in Oakland, Calif., Los Angeles and Houston. He was general manager, Willamette Iron & Steel Co.

PHILIP F. THAYER
. . . joins General Metals Corp.

Robert D. Barron was appointed manager of the National plant of **National Radiator Co.** in Johnstown, Pa. He succeeds **John E. Harris**, who was named manager of engineering at the firm's Viking Air Conditioning Division, Cleveland.

Metal & Thermit Corp., New York, elected **Richard O. Loengard** vice president.

Chesley Somerton was made assistant sales manager, **Wales-Strippit Corp.**, North Tonawanda, N. Y.

Halton A. Coward, vice president of **Budd Co.**, Philadelphia, and **Ernest R. Schmidt**, vice president-manufacturing, were elected executive vice presidents. **J. G. Richard Heckscher**, former commercial products manager, was elected vice president.

Clarence S. Wentworth was made central region sales manager of **Worthington Corp.** He was manager of the Detroit district office. Mr. Wentworth succeeds **William A. Meiter**, promoted to general sales manager.

Ralph W. Seely was appointed to vice president-sales, Columbia-Geneva Steel Division, **U. S. Steel Corp.**, Pittsburgh. He succeeds **M. J. Aurelius**, now vice president-general manager of sales for the corporation. Mr. Seely was vice president and general manager, Consolidated Western Steel Division, and is succeeded by **Charles W. Lee. R. E. Williams** was made

Masks

Conforming Matrix spray painting masks withstand thousands of applications, a complete year's run of high production. Plug-type keeps depressed areas clear while spraying background; lip-type protects background while painting depressed areas; block-cutout, plano-surface type coats restricted area for fast wiping operation; cap-type protects raised design while painting background.

Fixtures

Standard and special clamps and pressure fixtures hold mask and part firmly in position during spraying to assure exact registration. Reduce rejects, lengthen mask life, and speed production by freeing both hands for productive movements. Usually cost less than hand-made mechanical devices of comparable efficiency.

PRODUCT DEVELOPMENTS BY CONFORMING MATRIX

Mask Washing Machines

50% faster than any other mask washer. Avert costly production delays due to damaging of the fine wire bridging by hand scrubbing. Low solvent consumption. One company reports the consumption is only two gallons per eight hours.

Don't

LET OLD FASHIONED, OBSOLETE METHODS OF SPRAY DECORATING STEAL YOUR PROFITS!

Cut finishing costs. Greatly increase production with Conforming Matrix spray masks, fixtures, automatic machines and mask washers. Send prints or sample parts, giving production requirements and results desired. Recommendations as to the most efficient technique for handling your particular requirements incur no obligation.

Automatic machines permit increased production rates in intricate spray mask decoration, by as much as hundreds to one, over hand methods. Radically reduce labor costs and eliminate the need of experienced workmen. Rejects, common with careless or inexperienced hand spraying, are practically eliminated. Conforming Matrix builds a number of very flexible automatic machines, each can be manufactured to meet your specific requirements.

STATIONARY GUN PRESSURE CONTACT PAINTING MACHINE

For single color painting of depressed or raised areas up to $2\frac{1}{2}$" by $1\frac{1}{4}$", and fine details on dials and control knobs.

Placing the part into the mask and depressing the table top starts the paint operation. Completely air operated. Exactly the same amount of paint is applied to every piece regardless of rate of operation. Paint cycle automatically timed. Produces faster than any machine on the market. On demonstration production runs for final customer approval, produced at the following rates (including the necessary time for mask washing): Silver headlights painted on toy trucks at the rate of 1,215 pieces per hour; Block cut letters requiring secondary wiping operation painted on heater dial at the rate of 1,160 pieces per hour; Assembled toy truck painted silver at the rate of 1,215 pieces per hour; Curved die cast heater indicator parts at a rate of 900 pieces per hour.

Adjustable mount accommodates one or two guns. Requires floor space of only $18\frac{1}{2}$" x 27". The standard mask opening of 4" x 8" can be altered to fit the part.

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NAME _____

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CITY & STATE _____

assistant vice president-sales at Columbia-Geneva.

Atlas Mineral Products Co., Houston, elected **Joseph A. Snook** executive vice president; **Eugene Kirkpatrick**, general sales manager; **George Gabriel**, manager of manufacturing; **Gerald F. Gilbert Jr.**, treasurer and purchasing agent; **George L. Wirtz Jr.**, manager of product planning; and **Kenneth T. Snyder**, assistant sales manager.

Purchasing agents appointed for divisions of **Chrysler Corp.**, Detroit, include: **Wesley G. Embury**, Plymouth Division; **Donald W. Matzen**, DeSoto Division; **John F. Bowes**, Chrysler Division; **Stephen J. Roach**, Dodge Truck; **Kenneth E. Chamberlin**, MoPar Division; **Arthur Fields**, marine and industrial engine division and the Trenton, Mich., engine plant; **Arthur H. Hilverkus**, defense operations division; and **Horace M. Coy**, Airtemp Division.

Ford Motor Co., Dearborn, Mich., appointed **V. Y. Tallberg** executive assistant to the vice president-engineering, and **George E. Altmansberger**, director-engineering administration.

S. Sydney Minault was made general manager, equipment division, **National Research Corp.**, Cambridge, Mass.

William O. Yates was named general manager, Pacific Coast sales region, **Reynolds Metals Co.**, at Los Angeles. He replaces **William T. Ingram**, who transfers to Louisville as manager of regional sales.

GEORGE M. HOHMANN

E. R. WALSH III

. . . Alloy Rods elects v. p.-production, v. p.-sales

Alloy Rods Co., York, Pa., elected **George M. Hohmann** vice president in charge of production, and **E. R. Walsh III**, vice president in charge of sales. Mr. Hohmann is in charge of all production and manufacturing facilities, with headquarters in York. He was manager of the Pacific Coast Division. Mr. Walsh was formerly general sales manager.

Reo Motors Inc., Lansing, Mich., newly formed subsidiary of Bohn Aluminum & Brass Corp., elected **John C. Tooker** president; **James J. Dervin**, vice president, assistant to the president and director of material; **John L. Adams**, vice president-sales; **William M. Walworth**, vice president-engineering; **A. W. Zimmer**, vice president-manufacturing; **Robert J. Darragh**, vice president-treasurer; **Russell A. Smith**, vice president and legal counsel.

Louis Scharff was appointed manager, scrap iron and metal division, **Erie Iron & Supply Corp.**, Erie, Pa. He formerly was with Standard Iron & Metal Co.

Clifford L. Christensen succeeds **M. L. Richardson**, retired, as chief inspector for Toledo, O., Division, **Dana Corp.** He is responsible for the quality of all materials purchased for and produced by the division.

Malcolm M. Mosley was made superintendent of rolling mills at **Bethlehem Pacific Coast Steel Corp.'s** Seattle plant. He has been assistant superintendent of rolling mills since 1948.

OBITUARIES...

George G. Harrington, 56, vice president and chief engineer, **Hunt Tool Co.**, died Dec. 30 in Houston.

Frederick M. Cook, 63, purchasing agent in Buffalo for **Allegheny Ludlum Steel Corp.**, died Jan. 6.

Paul L. Kish, 51, sales manager, **American Spring & Wire Specialty Co.**, Chicago, died Jan. 6.

William B. Hackett, 65, of the **Lewis Machinery Division**, Blaw-Knox Co., Pittsburgh, died Dec. 24. Former vice president-engineering, he had been serving as consultant to the vice president and works manager of engineering and sales.

Jerald P. Moore, Cleveland district manager, **Electric Controller & Mfg. Co.**, died Jan. 13.

Joseph Cohn, 56, partner, **Consumers Steel Products Co.**, Cleveland, was killed in an airplane crash near Cincinnati Jan. 12.

James G. C. Morris, vice president, **Gibson-Morris Steel Co.**, Birmingham, died Jan. 11.

Albert W. Rosenow, 65, owner, **Washington Iron Works Inc.**, Williamsville, N. Y., died Jan. 5.

John A. Fallenson, senior partner in **Union Tool Co.**, Rochester, N. Y., died Jan. 8.

John Westendorf, president, **Premier Rubber Mfg. Co.**, and secretary-treasurer of **Dayton Casting Co.**, Dayton, O., died Jan. 4.

Dr. Albert J. Vits, 84, president, **Aluminum Goods Mfg. Co.**, Manitowoc, Wis., died Jan. 1.

J. Howard Hamilton, 52, former commodity manager, general sales department, **American Can Co.**, New York, died Jan. 8.

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It takes more than machines to make steel plates. It takes people. At Claymont, this emphasis on people reflects itself in personalized attention to every order—large or small.

Every step of the way, the handling of your order is under the painstaking supervision of experienced engineers, metallurgists, laboratory analysts, and skilled workmen.

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2641

GE To Build Plant

$20-million facility will produce transformers to meet rapidly rising demand

HOME OWNERS will more than double their electric power usage in a few years. This is the forecast of officials of General Electric Co., Schenectady, N. Y., and forms the basis for their decision to build a $20-million transformer manufacturing plant. The Transformer Division's facilities will be constructed in the Hickory-Newton-Conover area of North Carolina.

Large quantities of distribution transformers will be needed by utilities to furnish more electric power to homes. Power transmitted at high voltages for economic reasons is reduced to the low voltage used in homes by distribution transformers, says Raymond W. Smith, general manager of GE's distribution transformer department. More and larger transformers are required to handle the power whenever there is a large increase in power consumption.

Future Growth—The southeast section of the country was selected as the plant site since it is in this area that great future growth is forecast. The new facility will be an addition to the company's present transformer manufacturing facilities and not a transfer of operations from another area. The company has transformer plants in Pittsfield, Mass., Oakland, Calif., and Holyoke, Mass.

Actual construction will begin early this year. When completed in late 1956, the new plant will have about 400,000 sq ft of floor space. It will be a completely self-contained manufacturing operation with present plans calling for the manufacture of pole-type distribution transformers.

"The average growth of electrical usage in the home, on the farm and in small commercial establishments has doubled every 10 years since 1920 and in recent years the increase has been at an even more rapid rate," says Mr. Smith. "There is every reason to believe this usage will more than double in the years to come as more electrical equipment for heating and air conditioning and more appliances are put to use. New developments in this field, such as color television, are anticipated which will require even more electricity and will raise the standard of living beyond anything we can readily picture today."

Firm To Make Machine Parts

General Metallic Parts Ltd., a newly formed company, is erecting a plant at 16 Milford Ave., Toronto, Ont., to produce machine parts for aircraft and related defense industries.

Nox-Rust Chemical Renamed

Nox-Rust Chemical Corp., Chicago, changed its name to Daubert Chemical Co.

Toronto Firm Expands

Canadian Steel Improvement Ltd., Toronto, Ont., is planning expansion of present facilities to include a new bay for the forging of aluminum; a complete foundry for the manufacture of aluminum and magnesium sand, permanent-mold and pressure die castings; a pattern shop; and enlargement of the present tool room.

Opens Warehouse in Wichita

Marsh Steel Corp., North Kansas City, Mo., established a warehouse operation at 900 E. First St., Wichita, Kans., for distribution of steel and aluminum products. Joseph L. Lyons heads the Wichita organization.

Aluminum Fabricator Building

Fleet of America Inc., aluminum window manufacturer, will move its operations into an office and factory building being erected at 515 New Walden Ave., Buffalo.

Roxalin Co. Doubles Capacity

Roxalin Co. of Canada Ltd., Toronto, Ont., is doubling its productive capacity through the erection of a $200,000 addition to its plant. The firm is adding several new lines to round out its wide range of products, including industrial finishes and surface coatings for the preservation and decoration of metal, wood and plastics.

Aro Equipment Corp. Builds

Aro Equipment Corp., Bryan, O., is erecting a plant in Toronto, Ont., through its subsidiary, Aro Equipment of Canada Ltd. The Canadian firm will make the parent firm's products, including lubricating equipment, grease fittings, air tools, and aircraft components.

Kaiser Opens Sales Offices

Kaiser Aluminum & Chemical Sales Inc., Oakland, Calif., opened sales offices at 140 Stanwix St., Pittsburgh 22, and at 1806 Madison Ave., Toledo, O. These offices operate as branches under Kaiser Aluminum's district sales office in Cleveland.

Continental Retooling Plant

Continental Aviation & Engineering Corp., Muskegon, Mich., has taken over the former A. O. Smith plant in Toledo, O., for the manufacture of jet engines and portable generators. Using the plant under a contractual arrangement with the Air Force, its owner, Continental is retooling the factory.

Bailey Meter Opens Branches

Bailey Meter Co., Cleveland, manufacturer of industrial instruments and automatic control equipment, established district offices at 6331 Aberdeen Ave., Dallas, and at 3256 Hendricks Ave., Memphis, Tenn. F. D. Krusemark is manager of the Dallas office; R. E. Byers, Memphis office.

Lighting Fixture Firms Unite

Pittsburgh Reflector Co., Pittsburgh, recently amalgamated with Holden Lighting Manufacturers Ltd., Toronto, Ont., leased a factory in that city for production of the complete line of Pittsburgh lighting fixtures under the Holden name. Holden Lighting Co. will continue its present premises as the head office, says P. H. Green, president and general manager.

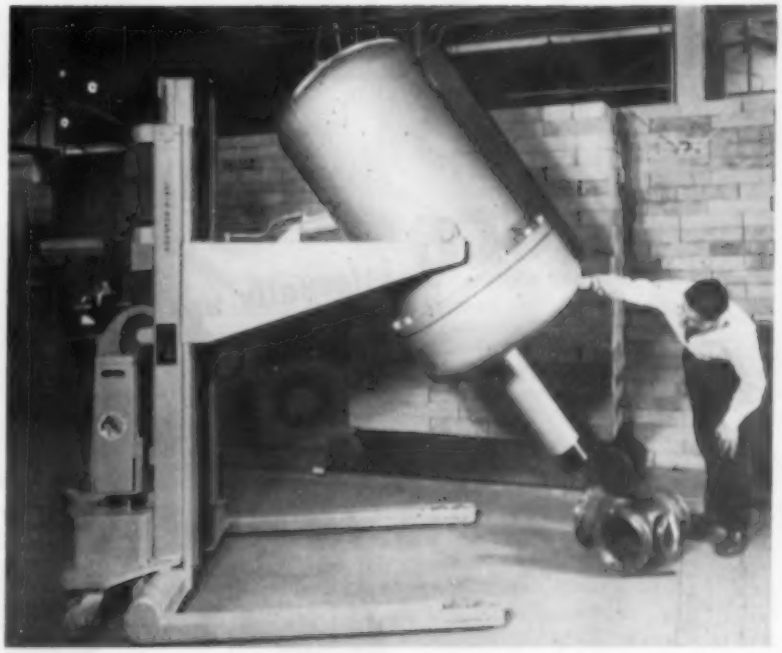
ASSOCIATIONS

Weatherstrip Research Institute, Riverside, Ill., re-elected E. M. Rodenbaugh president. He is president of National Metal Products Co., Pittsburgh. Other officers of the institute are Paul N. Collin, Allmetal Weatherstrip Co., Chicago, vice president; Elmer Barringer, Barland Weatherstrip Material Co., Cleveland, vice president; C. F. Smith, National Guard Products Co., Memphis, Tenn., recording secretary; J. L. Dennis, W. J. Dennis & Co., Chicago, treasurer; and L. G. Klee, Riverside, executive secretary.

Collapsible tube producers organized **Collapsible Tube Manufacturers Council** under the chairmanship of M. W. Dresden, president of A. H. Wirz Inc., Chester, Pa. Named to serve with Mr. Dresden are Frederic Remington, Peerless Tube Co., Bloomfield, N. J.; C. Christy Jones, Aluminum Co. of America, Edgewater, N. J.; Charles Stiassni, White Metal Mfg. Co., Hoboken, N. J., and Indianapolis; Victor Muscat, Victor Metal Products Co., Newport, Ark., and Chico, Calif.; J. H. Heideger, Standard Collapsible Tube Co., Rochester, Pa.; K. M. Leghorn, Sun Tube Corp., Hillside and Washington, N. J.; A. W. Paull Jr., Wheeling Stamping Co., Wheeling, W. Va.

National Safety Council, Chicago, awarded its highest honor, the citation for distinguished service to safety, to A. H. Zeilinger, safety superintendent at Colorado Fuel & Iron Corp.'s Pueblo, Colo., plant. Mr. Zeilinger has been instrumental in the achievement of CF&I's outstanding safety records throughout the years. He is first vice chairman of the council's metals section.

Cast Iron Soil Pipe Institute, Washington, re-elected F. T. Hamilton president for 1955. Mr. Hamilton heads the Anniston Soil Pipe Co., Rudisill Foundry Co. and Emory Pipe & Foundry Co., all of Anniston, Ala. Other officers reelected are P. J. Faherty of Lambertville, N. J., Buffalo Pipe & Foundry Co., Buffalo, vice president; D. W. Hallman of Quakertown, Pa., Hajoca Corp., Lansdale, Pa., treasurer. Homer E. Robertson, Washington, was reappointed executive vice president of the group.



Portable X-ray Unit Reveals Castings' Inner Secrets

This 1-million-volt Van de Graaff x-ray generator features high-quality radiographic results from a 1-mm focal spot, transportability and low cost in the supervoltage field. As illustrated, the unit can be furnished in a lift truck mounting for positioning flexibility without the necessity of an overhead crane. Detailed results can be made through steel sections ranging from ½-in. to 5 in. It is manufactured by High Voltage Engineering Corp., Cambridge, Mass.

J. C. Wilson Jr., president, Acro Welder Mfg. Co., Milwaukee, was elected president of **Resistance Welder Manufacturers' Association,** Philadelphia. David V. Uihlein, Banner Mfg. Co., Milwaukee, was elected vice president. The association's technical and research activities for the next two years will be under the supervision of J. F. Deffenbaugh, Federal Machine & Welder Co., Warren, O.

NEW ADDRESSES

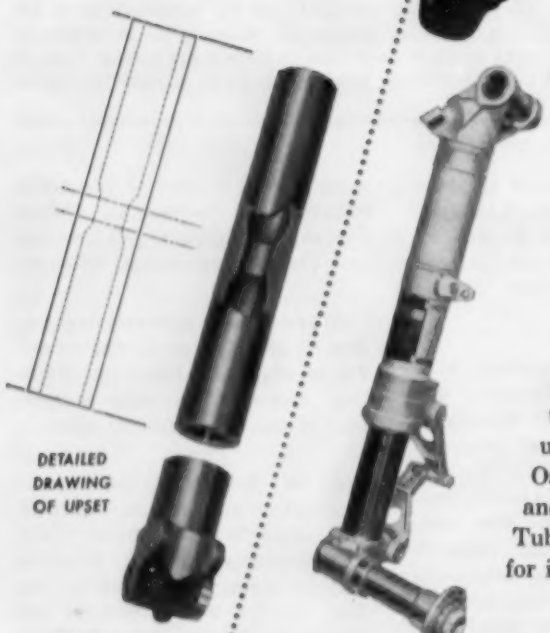
Larger quarters for representatives of **Robertshaw-Fulton Controls Co.,** Greensburg, Pa., were opened at 8406 W. McNichols Rd., Detroit. The offices will house sales staff members of the firm's Robertshaw Thermostat, Fulton Syphon, Bridgeport Thermostat and Fielden Instrument divisions.

Graver Water Conditioning Co., New York, opened a district office at 5343 McCormick St., Houston. James J. Hanratty is manager of the Texas district office.

E. W. Bliss Co., Canton, O., established sales offices at 816 N. Hollywood Way, Burbank, Calif. The company recently launched manufacturing operations at San Jose, Calif. Frank Strauss and Donald C. Walker of the Burbank office are responsible for sales of mechanical and hydraulic presses, Bliss-Dieco die sets and supplies, rolling mills and auxiliary equipment, canmaking machinery and special equipment. J. V. Harris continues as sales engineer for Northern California, operating out of San Jose. Star Machinery Co., Seattle, handles Bliss sales in the Pacific Northwest.

OSTUCO internally upset tubing processes faster

Saves $4.95 per unit



DETAILED DRAWING OF UPSET

INTERNALLY UPSET OSTUCO TUBING

COMPLETED GEAR ASSEMBLY

Landing gears, manufactured by The Cleveland Pneumatic Tool Company for North American Aviation's F-86H, have piston tubes machined from internally upset Ostuco tubing. The upset construction of these *special-quality* Ostuco tube forgings keeps machining to a minimum and permits faster processing. Savings are 25% . . . or $4.95 per unit.

Special-quality Ostuco tubing produces stronger, lighter products . . . better looking products at greater savings. Its uses are practically unlimited. Wherever you use tubing *in any form*, Ostuco's single source service can save you time and money. Write for helpful booklet "Ostuco Tubing," or better still, send us your blueprints for immediate quotation.

OSTUCO TUBING

SEAMLESS AND ELECTRIC WELDED STEEL TUBING —Fabricating and Forging

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EXPORT: COPPERWELD STEEL INTERNATIONAL COMPANY
117 Liberty Street, New York 6, New York

STEEL

January 24, 1955

Technical Outlook

RECLAMATION—Look for improved processes for salvaging materials now discarded or lost for various reasons. The importance of this endeavor is pointed up by the case of manganese alone: We discard more of the metal than is required for the steel industry, although the country is almost completely deficient in the metal.

ROCKET NEWS—Your trip to the moon is a step nearer reality, thanks to development of the first rocket engine in the U. S. that can be throttled up and down at will. While no other details have been released, the problem of throttling has been solved by Curtiss-Wright and the advanced systems will be useful in power-assisted take-offs and as main power sources for both piloted and pilotless missiles.

IT'S OFFICIAL—GM told the SAE recently that the Aldip process (STEEL, Oct. 11, 1954, p. 114) doubles automobile engine-valve life. The process forms an aluminum-alloy layer which retards high-temperature corrosion. Pontiac and Chevrolet are using it.

HIGH-TEMPERATURE ALLOY—Still on the subject of GM, GMR-235 is a new nickel-base alloy to add to the high-temperature list. In addition to nickel, it contains carbon, manganese, silicon, chromium, iron, molybdenum, aluminum, titanium and boron. The strategic elements are used in low percentage. Applications are in gas-turbine blades and buckets. More than 500 tons have been cast to date.

SMALL BUT IMPORTANT—Scientists are working harder than ever before to determine the effect of extremely small (trace) amounts of impurities on the properties of metals. Bruce W. Gonser, Battelle Memorial Institute, says that enough has been learned to show that the full potentialities of metals are still to be realized. As more is learned and better methods are developed for removing and controlling trace impurities, new properties in both new and old metals will result.

BRAZING NOTE—Work by Battelle Memorial Institute on brazing titanium to itself and to mild and stainless steels shows: Joints brazed by induction for 15 seconds are twice as strong as those furnace brazed for a much longer time. Torch-brazed joints are stronger than furnace-brazed ones but not so strong as the induction brazed.

CORROSION FOE—Armco says that the general reaction of its new type-2 aluminum-coated steel (which it has just started to produce commercially) to atmospheric exposure is the same as that of solid aluminum. Samples of both materials exposed under the same conditions for five years cannot be told apart.

ATOM TEST—Water made radioactive with hydrogen-3 (tritium) is being used to study moisture penetration into protective coatings.

HIGH-TEMP LUBE—A new lubricant built to operate at 400° F has a silicone base. It's expected to be commercially available next year—may find wide use in jet aircraft.

NO GASKET—A high-pressure, high-temperature gasketless joint for stainless-steel piping, good up to 600°F and pressures to 1600 psi, has been developed by the Naval Research Laboratory. Joining operations can be performed in an ordinary bench pipe-threading vise.

Metalworking Outlook—p. 31 Market Outlook—p. 99

No. 12 in STEEL's Modern Heat Treating Series

Small tool and die heat treating department at Lindberg Steel Treating Co., Melrose Park, Ill. Tempering furnaces left, quench tanks in center and hardening furnaces at right

HEAT TREATING TOOL STEELS

Water Hardening Types Part 1

By H. C. Manley and G. E. Brumbach
Carpenter Steel Co.
Reading, Pa.

IF A TOOL is to perform economically in service, it must give maximum production with the least amount of trouble and maintenance. This depends upon factors such as the right size and shape, accurate toolmaking, selection of proper kind of tool steel and correct heat treatment.

Analyze the requirements of a tooling job . . . investigate causes of tool failures: That's the way to anticipate what necessary properties like hardness and toughness should be.

The development of needed properties by heat treatment will be dealt with in a series of articles to be presented by STEEL during the next few weeks.

Fundamentals—Considerable effort is being made to transform the art of heat treating to a science. The results are given by the iron-iron carbide phase diagram, a portion of which is sketched in Fig. 1. It simply shows the phases that are in equilibrium at different temperatures at a variety of carbon contents.

Because it is known that small amounts of manganese and silicon in plain carbon steels have no significant effect on the general characteristics of this diagram, it will be used to illustrate the phase relations in a plain carbon water hardening tool steel.

Example—At room temperature, steel with 1.05 per cent carbon, 0.20 per cent manganese and 0.20 per cent silicon consists of a mixture of two distinct phases: The continuous phase is called ferrite; the other phase, carbide or cementite.

Because carbide particles are globular, (Fig. 3) this structure is termed as completely spheroidized. It is the structure steel mills usually ship.

Upon slow heating, Fig. 1 indicates that some of this mixture will transform to austenite on passing through the critical temperature of 1335° F. Just above 1335° F the plain carbon steel will be another mixture of austenite and carbide. On further heating, the amount of carbide will continuously decrease until at a temperature of about 1530° F it will disappear completely. Only one phase, austenite, is present above 1530° F.

Carbon Dissolves — The phase diagram shows that ferrite is capable of dissolving only up to about 0.04 per cent carbon at 1335° F. But the high temperature phase, austenite, can dissolve much larger

amounts of carbon, increasing from 0.80 per cent at 1335° F to 1.7 per cent at 2070° F. The broad range of mechanical properties given by proper heat treatment is based on this fact.

The slow heating just described rarely occurs in practice. Usually, work is heated at a faster rate by placing the cold tool in a hot furnace.

In this case, if the temperature of the furnace is 1700° F, the transformation to austenite occurs at 1360° to 1370° F. The temperature at which the carbide phase disappears is about 1620° F. With faster rates of heating using a salt or lead bath, the transformation to austenite takes place at about 1400° F and the point of final disappearance of carbide is close to 1700° F.

The same effect would, of course, be expected if an irregularly shaped tool is treated due to the fact that thinner sections heat up faster than thicker ones.

Another Factor—Up to now the time factor has been neglected. Here's what to expect: As the time at a specific temperature is increased, the phase transformations will approach the conditions given by the equilibrium diagram.

This is the first of a series of five articles on heat treating tool steels to be presented as a part of STEEL's Modern Heat Treating Series. Next week's will discuss quenching and tempering water hardening types. Succeeding issues will take up oil and air hardening, hot work and high speed tool steels.

This means: Although the iron-iron carbide phase diagram is not strictly true for the water hardening type of analyses under practical heat treating conditions, it is a useful guide on what to expect at various conditions of temperature and carbon content.

Recap — Two points have now been established as a basis for heat treating: First, austenite, (the high temperature phase) will dissolve much larger amounts of carbon than ferrite.

Second, to get the properties needed in a tool steel, one must know the conditions that control the size and distribution of the ferrite-carbide aggregate which forms when austenite is cooled below its stable temperature.

Here's Another Principle—For a specific steel having a particular initial structure, and austenitized in a certain manner, the structures obtained for different times at a series of subcritical temperatures (austenite unstable) are given in the form of a time-temperature-transformation plot.

The diagram for a typical water hardening tool steel containing 1.05 per cent carbon, 0.20 per cent manganese and 0.20 per cent silicon is Fig. 2.

New Structures—In the vicinity of 1300° F, the chart shows that transformation of the unstable austenite is slow starting and goes to completion slowly.

At 1000° F the delay in starting and the time required for completion is decreased. Structures formed in this temperature range are pearlite. They are characterized by increasingly finer spacing between the carbide plates and higher hardness as the transformation approaches 1000° F (Fig. 4).

Bainite Range—Let's look at the portion of the curve below the nose of the time-temperature-transfor-

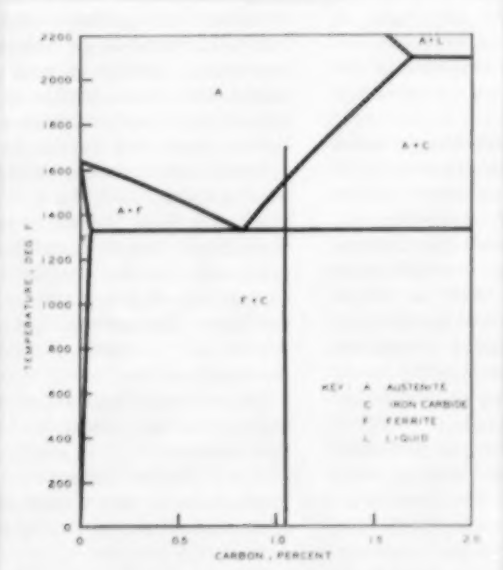


Fig. 1—The iron-iron carbide equilibrium phase diagram

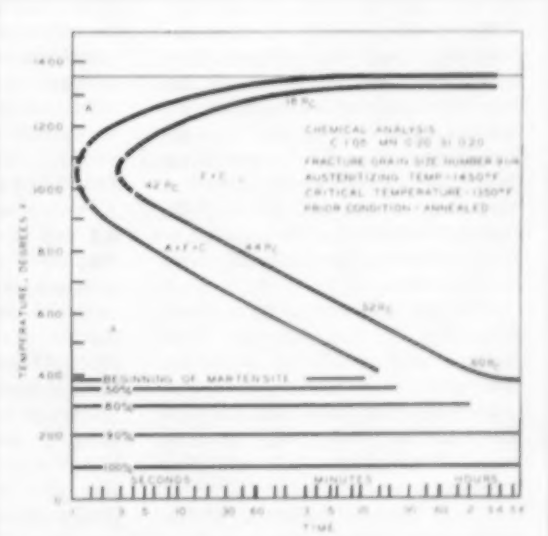


Fig. 2—The time-temperature-transformation diagram of a typical water hardening tool steel

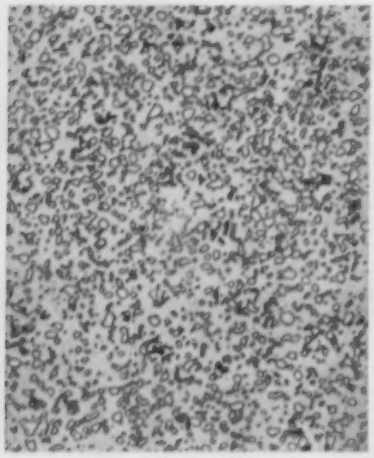


Fig. 3—Spheroidized—X1000. Etched in 2 per cent nital, rerubbed and etched in 5 per cent picral. Hardness is 10 to 15 Rc

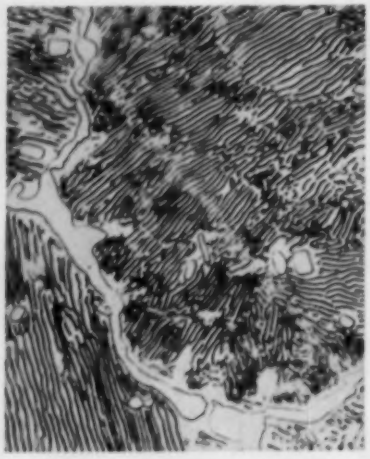


Fig. 4—Pearlitic—X1000. Etched in 2 per cent nital. Hardness is 20 to 25 Rc

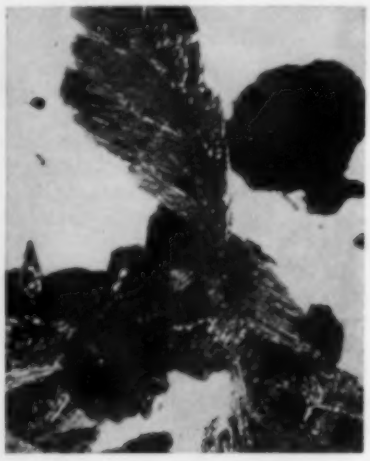


Fig. 5—Bainitic—X2500. Etched in picral. Hardness is 40 to 45 Rc.

mation plot. It's important to know that although the start of the austenite change to a ferrite-carbide mixture occurs at shorter times with decreasing temperature down to 1000° F, increasingly longer times are necessary in the range 1000 to 450° F. And the transformation product, bainite, is different from that produced at and above the nose of the time-temperature-transformation plot (Fig. 5).

Now consider the section of the figure from 450° F down to room temperature. There's a change in the way that austenite transforms.

Martensite—At all of the temperatures from the critical down to 450° F, the curve shows the transformation of austenite is dependent upon time as well as temperature; but at all temperatures from the horizontal line marked "beginning of martensite" (450° F) and downward, the decomposition of austenite is dependent only upon temperature.

The product formed is martensite (Fig. 6). It's different from pearlite and bainite in structure and hardness.

Martensite is important since it's the structure that gives the wide range of properties in steels. The time and temperature conditions at the most restricted portion of the time - temperature - transformation diagram determine whether it will form or not.

In plain carbon water hardening tool steel it is clear then that the nose of the time-temperature-transformation plot is the decisive factor.

Modifiers—In pointing out the use of the time-temperature-transformation curve, it was stated that if constant austenitizing conditions were satisfied, then certain structures and hardnesses at a specific subcritical temperature could be predicted. This should be qualified: The presence of alloying elements as well as coarse grain size at the hardening temperature displaces the entire curve to the right. It means more time is available for the initiation and completion of the transformation at all the subcritical temperatures.

On the other hand, the presence of carbide particles causes the pearlitic reaction to start sooner. This helps shallow hardening.

Principles Stand—Water-hardening tool steels may contain many alloying elements, such as larger amounts of silicon and manganese, and vanadium, tungsten, chromium, and molybdenum in varying quantities depending upon what the steel is designed to do.

The principles of the iron-iron carbide equilibrium diagram and the time-temperature-transformation plot of the water hardening steel containing 1.05 per cent carbon are, in general, applicable to the other water hardening steels that satisfy particular requirements.

Timbre—In addition to the definite effect of the austenitic grain size on the time-temperature-transformation curve, an important property, usually called timbre, also is largely dependent upon the grain size of the steel as affected by the austenitizing conditions used.

Granted, the grain coarsening tendency of water hardening tool steels is usually controlled by the steel manufacturer, it is still important for the heat treater to recognize the effects (such as increased cracking during hardening) that can be expected when lack of grain coarsening control or poor timbre exists. The heat treater must be certain he is working with a tough timbre water hardening steel.

Test — As a check, he can brine quench from 1550° F a ¼-in. thick disc taken from the end of the purchased bar, then fracture it. If the grain size is fine (determined by comparing with a standard set of fractures) the material has a tough timbre and hardening cracks will not be a problem.

Water hardening tool steels owe their great usefulness to the fact that even moderately sized sections will not harden throughout. This gives a hard, wear resistant case of martensite supported by a tough core of fine pearlite.

Pointers — The case depth depends upon the hardenability of the particular steel. Major factors are: Chemical composition, grain size of the austenite, presence of

Fig. 6—Martensitic—X1000. Etched in 2 per cent nital. Hardness of completely martensitic structure is 66 to 67 Rc

carbide particles at the quenching temperature, prior structure of the steel and the rate of heating.

It has already been shown with the time-temperature-transformation diagram that the hardenability (depth of useful hardness) depends on the time available at the temperature of the nose of the t-t-t plot. Because so many factors affect the transformation of austenite to other structures, it is necessary to adopt some method of cataloging the useful hardness depth as a function of some one variable that can be measured in a simple way.

Practical Figure—The time-temperature conditions at the most restricted part of the chart generally are expressed by the critical cooling velocity idea. This is the lowest rate, measured at 1300° F, that a specific steel must be cooled to obtain a structure of 50 per cent martensite and 50 per cent fine pearlite, with hardness of 55 Rc. This particular structure and hardness is the boundary of the case and core.

Atlhough the effect of a number of variables on the time-temperature-transformation curve can be predicted in a general manner, the critical cooling velocity idea measures the same effects more exactly. This means it is more useful for the heat treater.

Examples—The relationship between hardenability and critical cooling velocity has been explored for a variety of conditions. For example, it is valuable to know

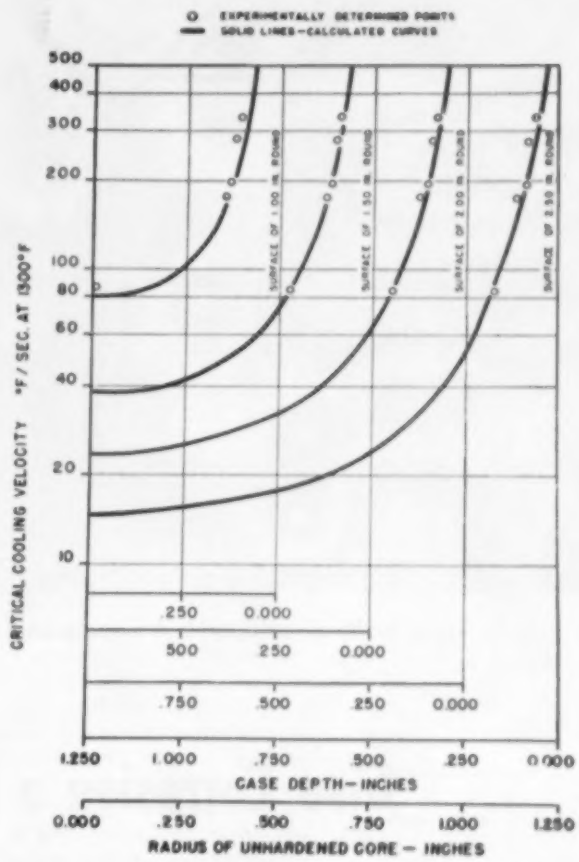


Fig. 7—Calculated hardness penetrations compared with experimental values. Quenching temperature 1450° F, agitated brine

not only the case depth that can be expected for a certain size round as a function of the critical cooling velocity but also how the case depth varies with size at constant critical cooling velocity.

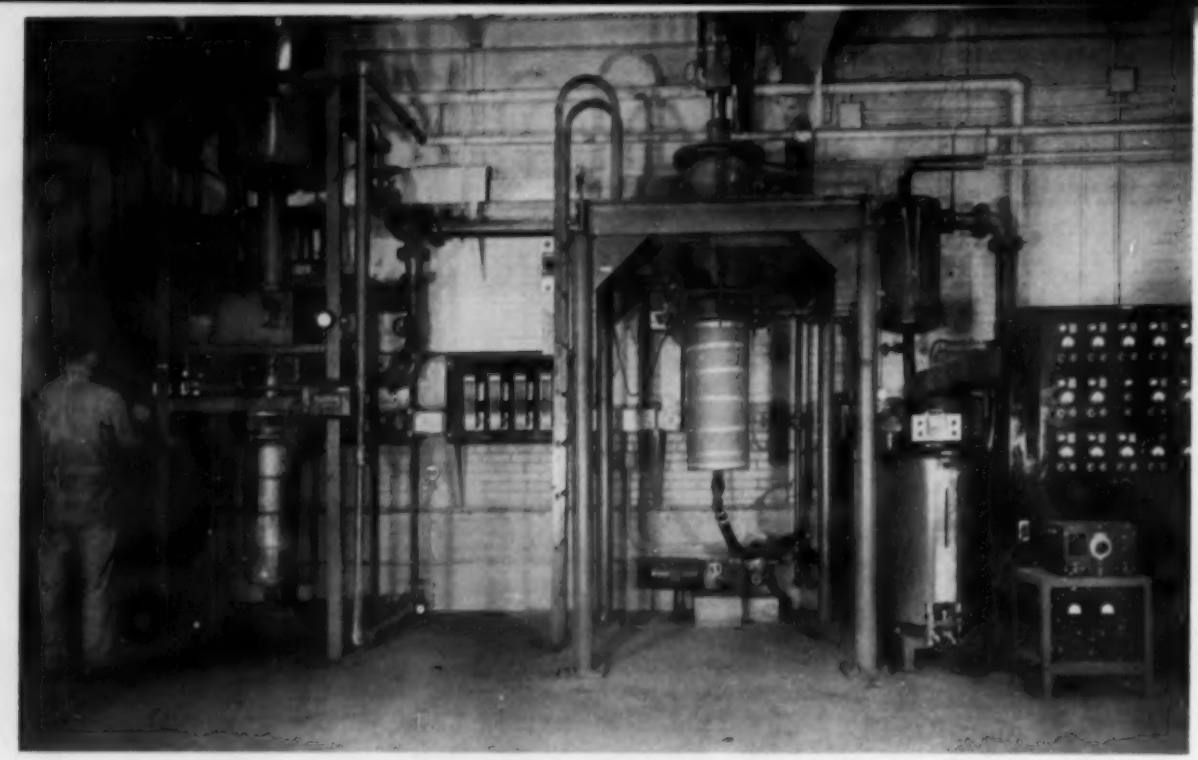
Fig. 7 shows the depths of hardness for different size rounds, as a function of the critical cooling velocity at 1300° F, that are obtained in all water hardening tool steels made today. It can be seen, for example, that a steel with a critical cooling velocity at 1300° F of 200° F per second would have a case depth of 0.14 in. for a 1-in. round; depth would be 0.08 in. if a 3-in. round was used under the same conditions.

Atmosphere—The hardening atmosphere has effect on the surface condition of the tool. A reducing one is characterized by excess carbon monoxide; an oxidizing one by excess oxygen. The usual effects are scaling, decarburization and carburization.

Scaling and decarburization in the water hardening grades are normally associated with an oxidizing atmosphere. They usually occur to an objectionable amount above 1700° F. Most water hardening tool steels are quenched well below 1700° F, and a slightly oxidizing atmosphere may be used without excessive scaling or decarburization.

Experience shows most water hardening grades have a satisfactory surface when hardened from a furnace atmosphere that contains from 2 to 5 per cent excess oxygen. The atmosphere must be continuously moved over the work; otherwise, stagnant regions that tend to become less oxidizing will develop, and a decarburized skin will result.

(To be continued next week)



Firth Sterling Inc.

This vacuum furnace melts zirconium. A rare metal a few years ago, it's ready to . . .

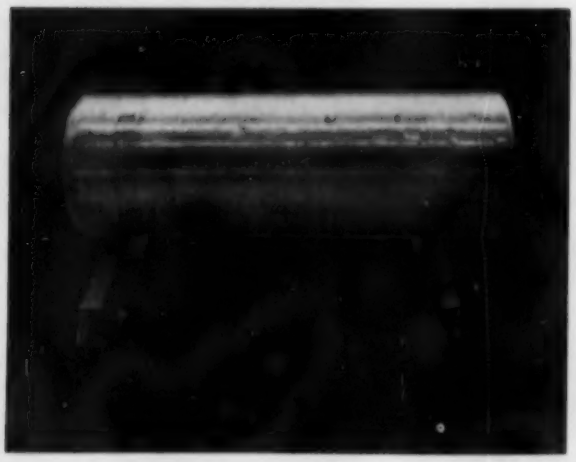
Give Corrosion a Run for Your Money

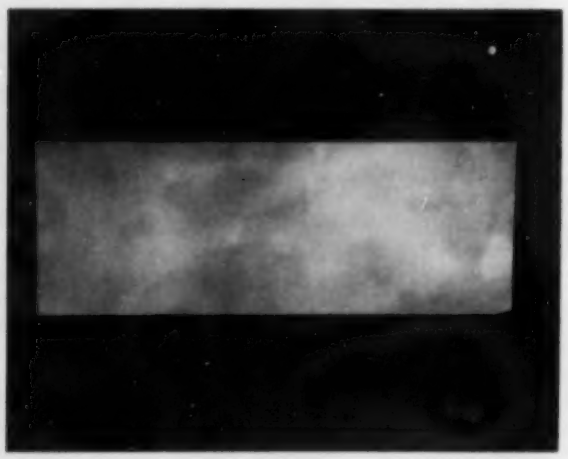
IF YOU have a tough corrosion problem, zirconium may be your ace in the hole.

While its extraordinary corrosion resistance was known 20 years ago, the fact was of little use until recently because of its high cost and short supply.

Thanks to atomic energy needs, supply is now adequate for any reasonable commercial use.

It's Still Costly — Price ranges from $25 to $35 a pound for the rolled product. "But high cost is not necessarily a deterrent because of the small quantities that are used in the vital points of a highly corrosive system," says Kenneth





(Left) zirconium ingot; (right) commercial zirconium sheet

D. Mann, president, Firth Sterling, Inc., Pittsburgh. Zirconium is being tested in valve parts, pumps, meters, agitators, seals, filter screens, crucibles and electronic-tube components.

Last year Firth Sterling installed a double-melting facility using the consummable-arc method to produce high-purity zirconium. It's offered as ingots, billets, bars, rods, wire, strip, sheet and tubing in a variety of sizes.

Versatile — Since the metal is fabricated by casting, forging, rolling, drawing, extruding and welding, it can be made into any needed shape. This enhances its use as compared to other special materials, such as chromium carbides, where size and shape are limited by the inherent properties of sintered compounds.

Techniques for cladding common structural metals with zirconium are being studied. Rolling of foil (0.00035 in.) is under investigation; wire is being drawn to 0.0018 in.

Property-wise—Zirconium is as strong as steel but somewhat lighter. It has a high melting point, 3350° F. It does not absorb neutrons—a property important to the AEC and the industrial atomic power program.

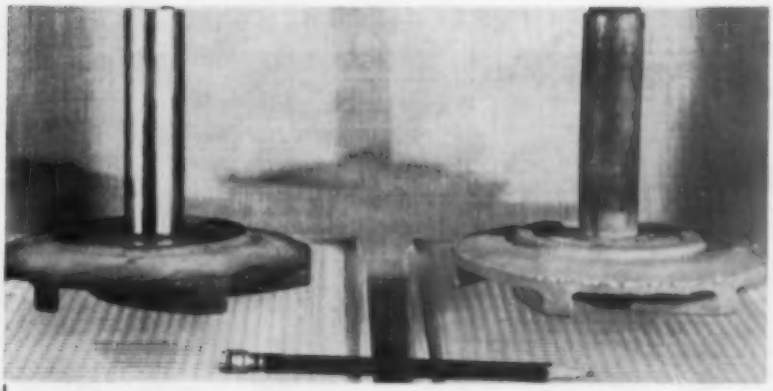
Atomic power activity requires low hafnium zirconium alloys. Only thermal neutron reactors need zirconium. Intermediate and fast reactors can use conventional structural materials.

But the one outstanding characteristic that accounts for growing commercial interest in zirconium is its resistance to corrosion. In various mediums it surpasses stainless and resembles expensive tantalum.

Zirconium's resistance to alkalis is excellent. It stands up to hydroxide concentrations in all concentrations up to the boiling point. Fused caustic has no effect on the metal either.

It will take sulphuric acid at all temperatures up to about 80 per cent concentration. Straight nitric acid at any strength does not attack zirconium.

Its resistance to hydrochloric acid is outstanding; it will stand concentrations up to 20 per cent at the boiling point. Hot phosphoric acid does not attack the metal.



Two rotating elements from pumps. (left) Zirconium shaft sleeve pressed to steel and sealed with plastic. (right) Iron sleeve showing corrosion cracks

Zirconium Pays Its Way

FOR the past three years, zirconium has been used to good advantage at the Bureau of Mines' zirconium plant at Albany, Oregon. The most frequent application is for resistance to hydrochloric acid. Other uses: Sulphuric acid solutions and fused caustic.

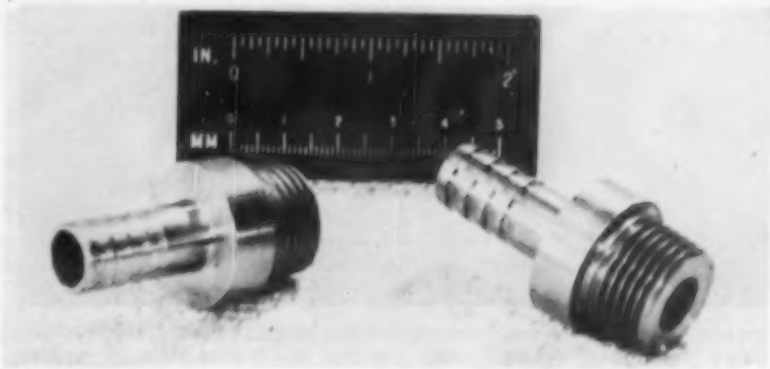
In the many processing steps used to produce zirconium by the Kroll process, there are many corrosive atmospheres and solutions that defy the usual materials of construction. The Bureau of Mines states: "This makes the Kroll process a useful proving ground for practical applications of zirconium."

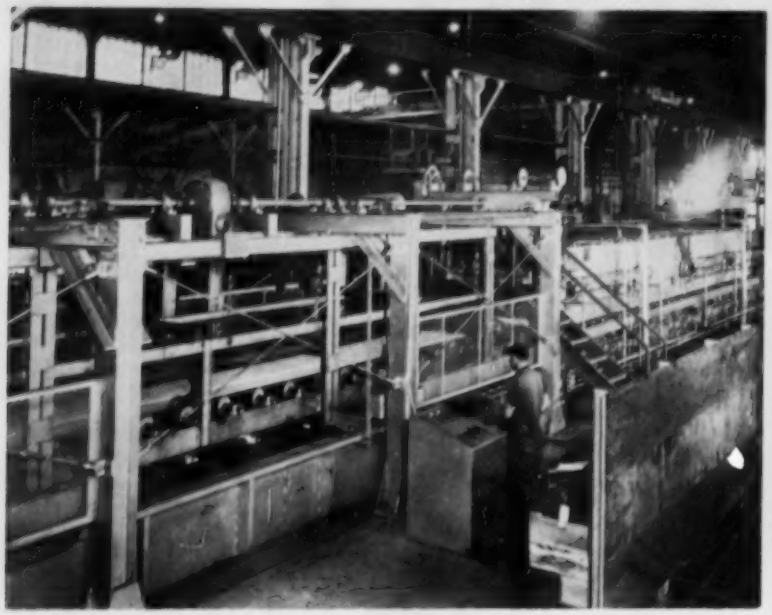
The Bureau's conclusion: Zirconium has excellent resistance to most corrosives and can be considered an all-purpose metal. Photos on this page show typical uses at the Bureau's proving ground.

Zirconium steam jet

Plates, bolts and spacer nuts are zirconium

Zirconium adapters for use in concentrated hydrochloric acid service

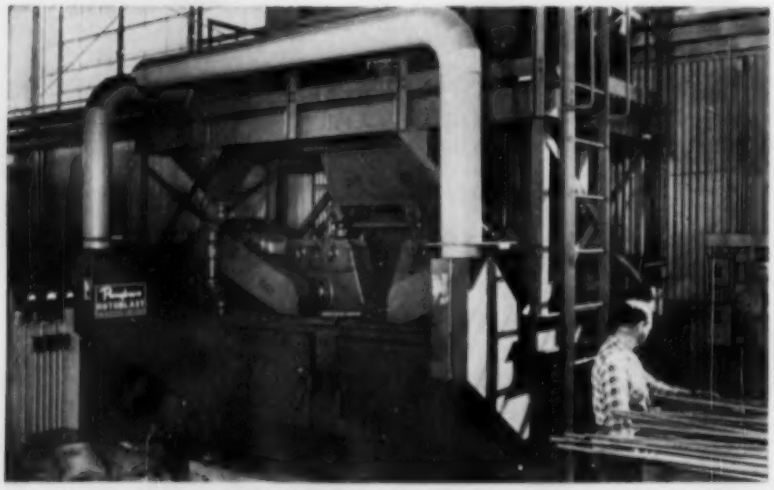




This Drever annealing furnace lends itself to the kind of flexibility Rotary needed. Photo at right shows operator preparing a charge at entry end

Stainless Specialty Shop Highlights Trend

Selling more finished bar product is Rotary's aim in this latest growth move. Batch-type, roller-hearth annealing furnace considered key component



First step in the new finishing department is descaling in this Pangborn machine. Scale is shot blasted from stock which is rotated as it is drawn through machine

WALK into the new L-shaped mill building at Rotary Electric Steel's sprawling Detroit plant and you'll find yourself in one of the most modern stainless processing shops in the industry.

It all started with a management decision a little over a year ago to market more of the company's stainless output in finished items. Having one of the most flexible bar mills in the industry but no finishing equipment for flat rolled products, direction was quickly established. Rotary was going into the stainless specialty bar business.

Bottleneck — Production-wise the decision posed no problems. The six electric furnaces in the melt shop were already turning

THE KING'S ARMOURER

Most skillful of all the metal workers was the King's Armourer, sketched by our artist from an old steel engraving. With all the cunning of his craft, the armourer selected finest steels and fashioned breastplate and helmet for his liege, fitted them to his royal person, and kept them always bright and shining and in perfect repair.

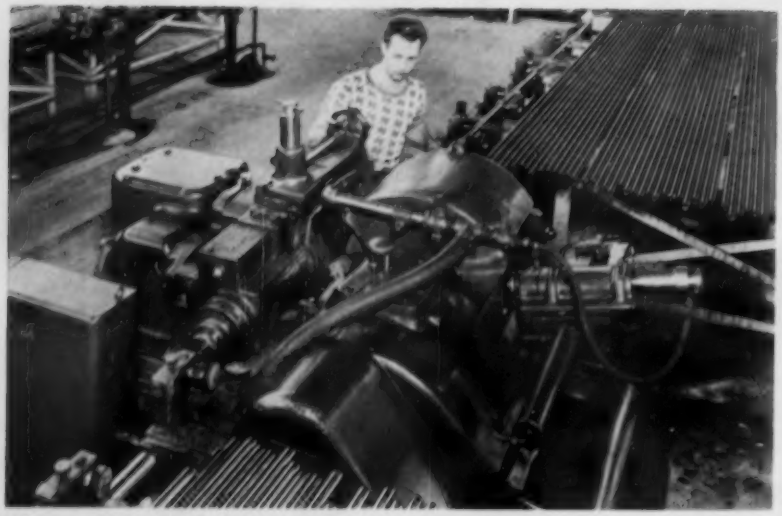
Crafts and craftsmen through the ages

NUMBER ONE OF A SERIES

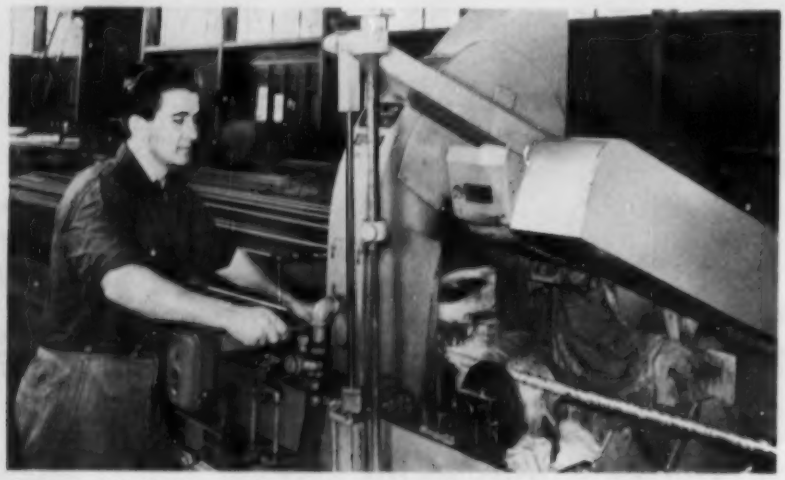
Today, too few manufacturers in addition to selling their products see to it that they also fit customer needs exactly and deliver the greatest possible benefits. Basic not only manufactures quality refractories for the construction, maintenance and repair of open hearth and electric steelmaking furnaces, but employs skilled engineering personnel to insure that the use of these products gives full value.

BASIC REFRACTORIES INCORPORATED CLEVELAND 15 OHIO

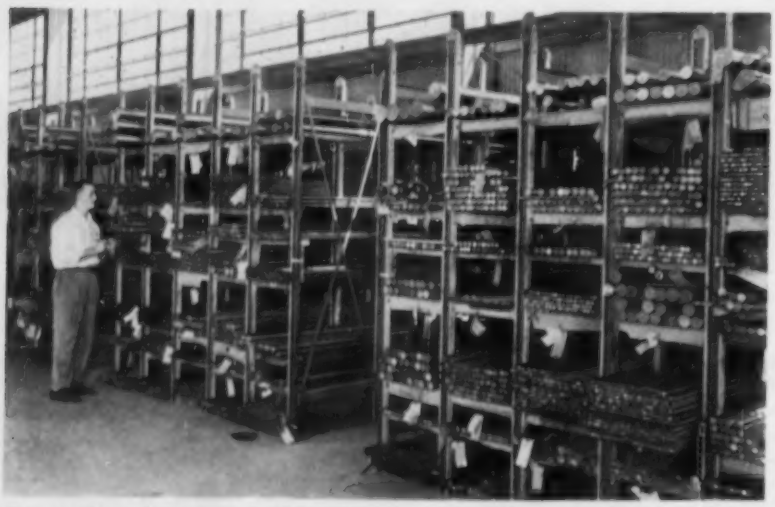
REFRACTORIES ENGINEERING AND SUPPLIES LTD.—EXCLUSIVE CANADIAN AGENTS



After straightening on one of several machines, bars go either to high-speed turning machine or to one of five centerless grinders for surface finish or sizing



Operator of this Campbell wet-abrasive cutoff machine cuts finished bars into warehouse lengths. Two such machines are employed



One section of the new finishing department has been set up for warehouse stocking. Note the extreme size variation

out carbon, alloy and stainless. The 36-in. blooming and slabbing mill was equipped for the fast roll changes, as were the billet and semicontinuous bar mill. The bar mill, by the way, rolls rounds, ½-in. to 4½ in. in diameter and hexes from ½ to 2 in. in diameter—one of the largest size ranges in the country.

But the real bottleneck was in annealing. Car-type units already in use wouldn't lend themselves to desired small-batch flexibility, nor were they made for top annealing temperatures of 2200 F. A Drever roller hearth furnace looked like the best solution, but it had never been used on a product mix like this—everything from ½ to 4½ in. bars, plus coils of wire.

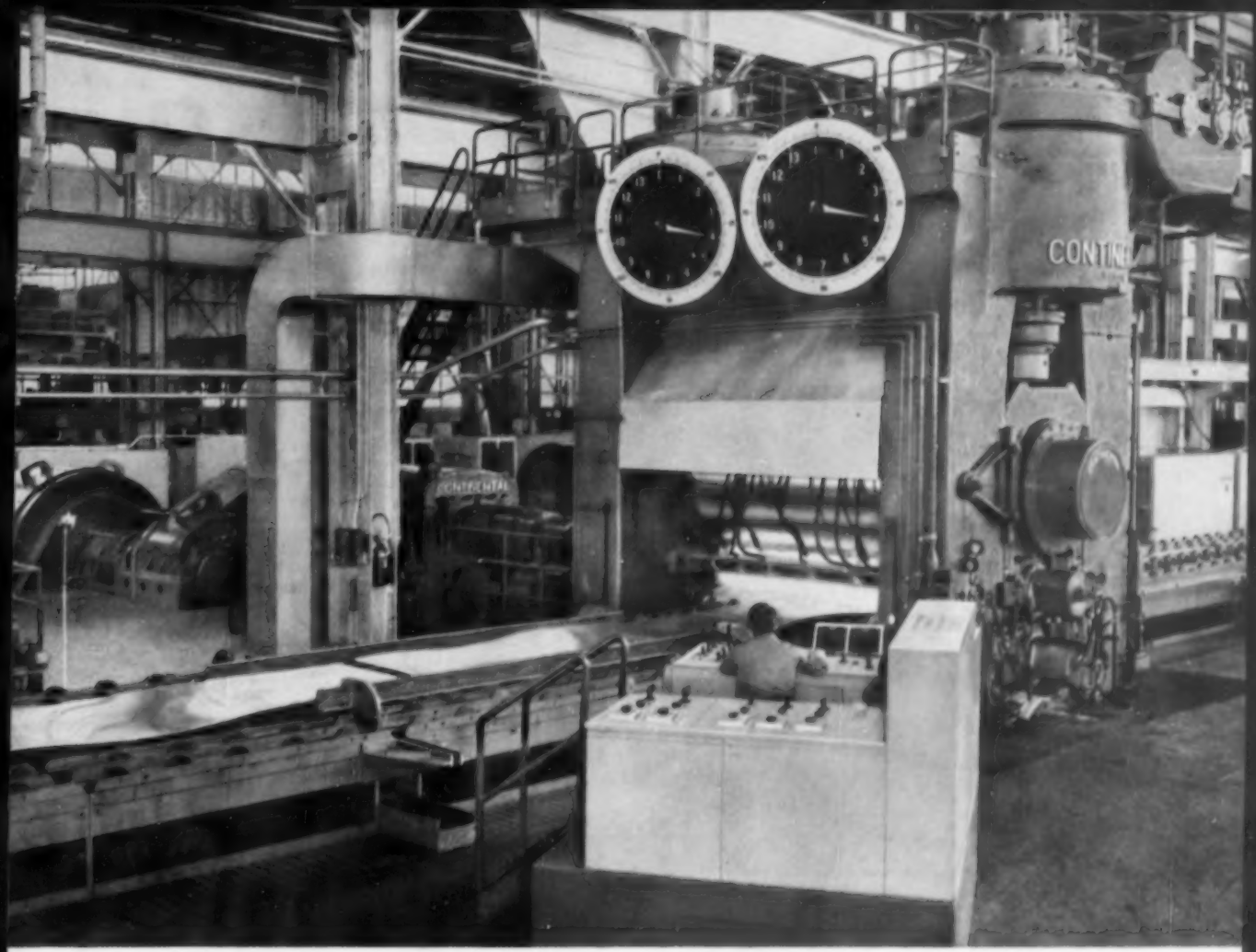
Works Fine—Cold bars are arranged on the 40-in. wide entry table while the preceding batch is in the furnace. When heating is complete, the operator moves the hot batch out and cold batch in at 105 fpm. The 38-ft long hearth accommodates bars up to 36 ft long or several skids of coiled wire.

Length of the entire installation, including entry table and quench tank is 153 ft. Output is about 2 tons per hour of 400-series steel or 3 tons of 300-series alloys. The 400 series can be oil quenched in the same tank merely by pumping water out and admitting the oil from a nearby storage tank.

Hearth rolls are made of carborundum and are water cooled. In operation they move the load 18 in. in either direction during heatup to prevent warping of the bars and to keep rolls from overheating.

Different Atmosphere — After annealing and quenching, stainless products move into the new finishing department. Here in an atmosphere completely different from that of the rest of the mill, Rotary converts bars, shapes and wire into warehouse items.

Bars first get a shot blasting in the new Pangborn 2-wheel machine. This removes most of the anneal scale, but some grades may require light acid dips to complete the job. After straightening, bars can be turned on a high speed Medart machine, centerless ground on one of five Cincinnati machines and cut to length on one of a pair of Campbell wet-abrasive cutoff machines.



144-inch Four-High Tapered Plate Mill, Aluminum Company of America, Davenport, Iowa.

Now! A high-precision Plate Mill by Continental

This heavy-duty Continental 144-inch four-high plate mill built for Aluminum Company of America's Davenport, Iowa, Works produces a uniform, predetermined end-to-end taper in both sheet or plate aluminum alloy, as well as the full range of commercial plate. Both hot and cold rolling operations are performed on this mill. Gauges and tapers are maintained to the most exacting requirements. Continental produces—from preliminary engineering to satisfactory operation—varied types of ferrous and non-ferrous mills, with complete auxiliaries, for flat and shape rolling.

Plants at
East Chicago, Ind. • Wheeling, W. Va. • Pittsburgh, Pa.
Copes-Vulcan Division, Erie, Pa.

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CONTINENTAL
Foundry & Machine
Company

Billet Peeling pays dividends!

Carbon, Alloy or Non-ferrous

This Continental-Medart billet conditioning process pays dividends in speedy operation and complete recovery of metal.

Billet peeling—as compared with scarfing or pickling—ends problems of air and river contamination . . . eliminates burning, and salvages all waste metal for remelting. The Continental-Medart method is the fastest billet peeling operation, ranging from 1 to 40 feet per minute throughput. The operation can be arranged for close surface control or deep, hogging cuts on diameters from 3″ to 33″.

Continental-Medart has built the largest Billet Peeler in existence and regularly produces a full size range. When your operations call for fast, accurate billet conditioning, call in your Continental-Medart representative.

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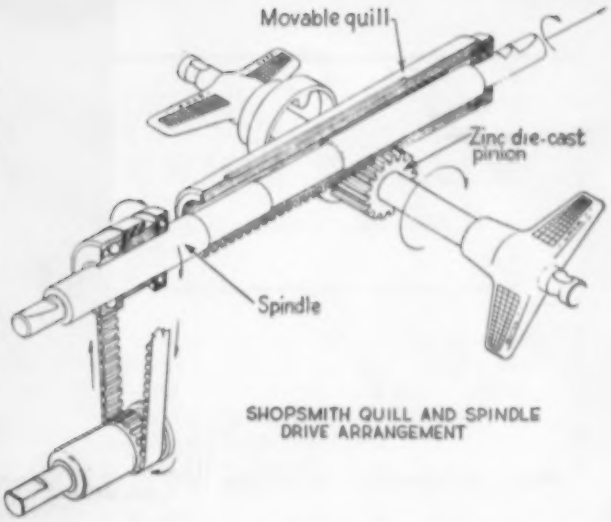
Company

Steel shaft acts as an insert as a zinc-alloy pinion gear is cast around it. Costs were sliced 31 per cent on this job as the finished gear is cast in one operation



SHOPSMITH QUILL AND SPINDLE DRIVE ARRANGEMENT

Rotation of the quill feed pinion moves the quill and spindle assembly into and away from the work. Axial movement locks the quill and spindle

Designers Take to Diecasting

THE DIECASTING business is booming, and the experts are confident their only trend is up.

Since 1946, diecastings' shipments have climbed some 22 million pounds to an estimated 69 million in 1954. Guessing now is that 1955 will set a new record.

Motivator—Key man in this growth picture is the industrial designer. The promise of diecasting has made it possible to ignore his old limitations on shapes and take on a whole new set.

In addition to the wider selection of shapes, the designer is frequently aided by the ability of diecastings to compete costwise by simplifying fabrication.

Case in Point—As an example of the latter facet, the use of zinc alloy diecasting for the quill feed pinion on the Shopsmith Mark 5 power workshop produced a 31 per cent cost reduction. At the same time it met stringent axial and tooth-loading requirements for Magna Engineering Corp., Menlo Park, Calif.

The pinion assembly was previously made up of a hobbed steel gear shrunk onto a steel shaft. Cost was relatively high due to extensive machining and assembly operations.

Obstacles—When the diecasting suggestion was considered, two requirements were of major concern to the Magna engineering department: The gear must be firmly secured to the shaft to permit axial loading when clamping the quill in the headstock, and the gear teeth must be sufficiently strong to provide the tension required for heavy drilling, mounting work between lathe centers, and other operations.

To test the ability of die-cast parts to meet these requirements, sample assemblies were subjected to an axial load of 2000 lb for 24 hours.

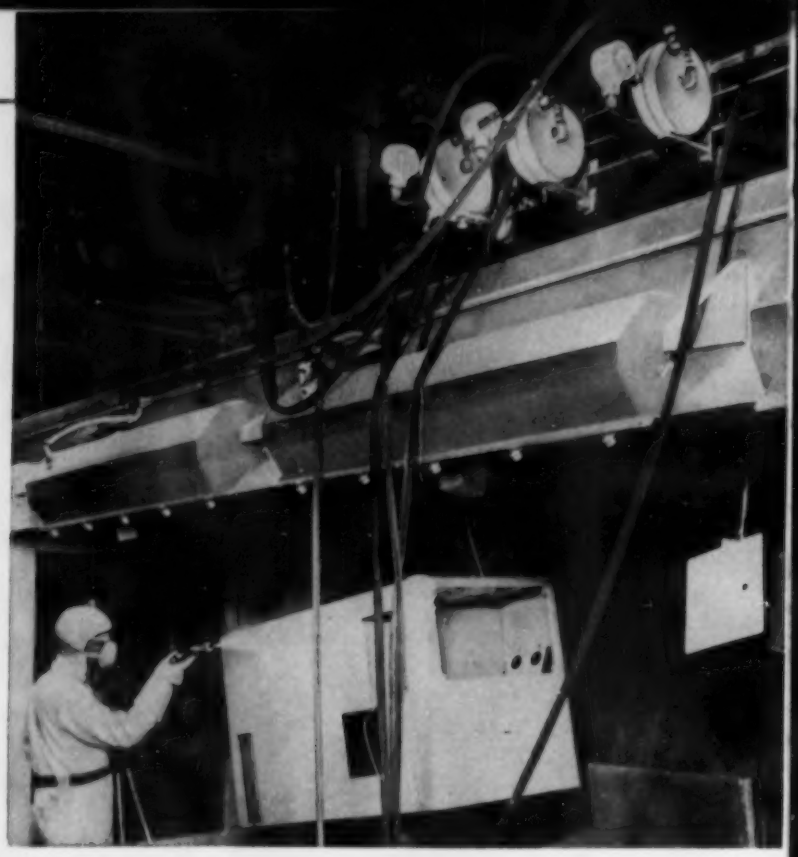
To test for tooth strength, the assemblies were mounted in headstocks and loaded with 200 lb, applied at the feed lever. In the axial loading test, the die-cast pinion did not creep along the shaft. In the second test, no cracks, checks or other evidence of potential tooth failure developed.

Precision—The new pinion assembly consists of a steel shaft. The zinc alloy gear is cast around this shaft. Four straight-milled slots across the midpoint of the shaft's length secure the pinion axially. The pinion is cast of Zamak-5 zinc alloy, a high tensile and impact strength material, by Los Angeles Die Casting Co.

Big advantage in using a zinc die-cast gear in this application is that the teeth are of correct contour and evenly spaced. Precision is said to equal that obtained in the ordinary run of cut gears. Each gear substantially duplicates every other gear and die wear is not significant.

The shaft acts as an insert during the die casting process. Assembly of shaft and gear is accomplished simultaneously and automatically with actual production of the gear. Gears are produced at the rate of 140 an hour, two castings being made at one time. Following removal of the casting, the gear is die-trimmed to remove flash and the shaft is oiled. No further operations are required.

More production at lower unit cost. That's what hot spray finishing did for this maker of home freezers



Hot Spray Smooths Out Rejects

"WHY DO OUR freezers go through the plant with precision control until they reach the paint department . . . where quality control may be upset by small variations in temperature, humidity, paint viscosity and even the whim of a spray operator?"

That's the question Al Schreiber, paint superintendent at Ben Hur Mfg. Co., Milwaukee, asked himself about two years ago.

The answer came when he investigated hot spray painting. Almost overnight he was convinced that the paint department could equal the uniformity and reject ratings of the company's punching, cutting and assembly operations.

Reasons—The better uniformity he was looking for stems from the fact that hot spray substitutes heat for thinner. This means that viscosity is uniform; temperature is constant.

In cold spray application, a certain viscosity is obtained by the addition of thinner for proper atomization and flow out. On the other hand, viscosity must not be reduced so much that a run or sag will occur on a vertical surface.

This balance of solvents to solids may be all right at 8 in the morning but way off at noon because of temperature changes in the spray room.

Less Change—Here's an important point on the side of hot spray: While there is 30 per cent variation in most material viscosity between 60 and 75° F, there is less than 4 per cent change between 150 and 156° F. Hot spray offers viscosity control that is seven times better than other methods of application. When Ben Hur took a look at what their Spee-Flo hot spray unit was doing for them cost-wise, they were surprised, too.

Cost Less — Improved quality control not only cost less but valuable time and material savings were in the picture. Faster application made for a cost reduction of over 30 per cent in finishing time. Less overspray reflected a paint savings of 25 per cent. Similar savings in manhour costs came from less time for booth clean out.

The higher gloss from the hot spray finish produces a better looking freezer. Runs and sags are eliminated. An over-all reject reduction of 65 per cent was chalked up.

Salt spray tests on hot vs. cold spray cabinets showed better adhesion, improved gloss retention and even better impact resistance with hot spray application.

The Spee-Flo hot spray unit used at Ben Hur reaches full heat in 3 minutes and maintains it automatically. Circulating models, for intermittent applications, use the same heater, plus a simple centrifugal pump.

HOT SPRAY CHECK LIST

IMPROVED BUILD AND HOLDOUT

Paint film deposited has less solvent content, giving greater film build, minimum penetration.

REDUCED SHRINKAGE

Low solvent hot spray means smoother work, less reflection of scratches, flaws and surface imperfections due to shrinkage.

GREATER COVERAGE

One coat of heat reduced, high solids material will often give coverage previously requiring two coats.

SAVES MATERIAL

Spraying pressures average one third lower due to reduced viscosity. This reduces wasteful overspray.

INCREASED PRODUCTION

Four passes of the spray gun may usually be reduced to two, with an equivalent dry film thickness.

STOPS SAGS AND RUNS

Nearly sagproof application often gives needed dry film thickness in one coat instead of two.

ELIMINATES BLUSHING

Material reaches surface at or slightly above room temperature, preventing condensation to cause blushing in lacquer.

CONTROLLED VISCOSITY

Constant temperature gives hot spray application the advantage of constant and controlled viscosity in material.

MACHINE TOPICS

By R. F. HUBER, *Machine Tool Editor*

YOU'LL probably see more change in machine-tool design in the next few years than you have in the last 15.

The reason is the builders are out to make obsolescence obvious to everybody. Actually, it's a must for them. Replacement of these obsolete machine tools will be their bread and butter business for some time to come.

Narrowed Market—Export of machine tools has dwindled to the point where it's no longer a significant portion of the builders' business. From a 1949 level of about 25 per cent of total shipments, exports have dropped to about 9 per cent.

There's little chance of this picture improving. U.S. dollars have built up foreign machine-tool industries so they not only can supply machines for their own countries but can export them. When the foreign buyer wants an American-made machine, he frequently can't get the dollars to pay the cost of the machine (built at as much as 5 times the labor cost of foreign machines), plus a stiff local tariff. If he has the dollars, he often can't buy the American machine if the same type is made in his country.

Just when the foreign market has gone poof, defense spending is down, plant expansions are tapering off and builders are left with the job of selling to their toughest customers—the men who already have machines that run.

Coming—For the machine-tool builders this means shirtsleeve selling in a tough market, but for the machine tool user, it means rapid development and improvement in the machine tools he'll have available.

For one thing, all machine tools are taking a page from the automation notebook. Even on hand-operated machines, more functions will become automatic or at least pushbutton operated.

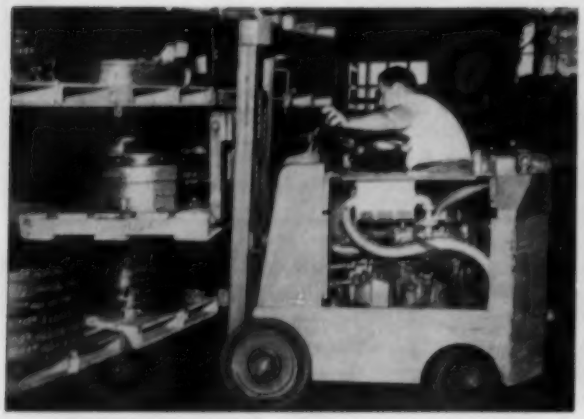
Following the trend toward higher cutting speeds, machines will be more rugged, many will step up horsepower from 10 to 100 per cent. Look for more specials. Even the standard machine tool of today is seldom sold without special tooling, special fixtures, etc. A little more development in this line will turn the subtle corner from the semistandard to the semispecial—often with little sacrifice in basic versatility.

Look also for wider speed and feed ranges, more use of preset tools and improved work-holding devices.

As for automation, more standardization on components will cut equipment costs. It'll make more automation practical for more users.

Business Jumps

There's a wisp of a sign that the builders' new program is taking hold. It's too early to know exact figures, but it seems to be a good bet that both machine-tool orders and shipments for December of '54 were up from preceding months, maybe by as much as 30 per cent. One month's figures don't make a trend, but at least it looks like the industry had a merry Christmas



Monroe Calculating Machine Co. mechanics installed units in their Orange, N. J. warehouse trucks. No cases of employee nausea or headache have been reported since

Eye-smarting and nausea lowered efficiency and morale at American Metal Products Inc., Los Angeles, before they attached catalytic mufflers on four lift trucks

Cut Engine Exhaust Hazards Indoors

GASOLINE-powered fork trucks are taking on more indoor jobs—but they're leaving their headache and nausea-producing exhausts out of the picture.

Thanks to an efficient device known as the OCM catalytic exhaust, deadly exhaust fumes are converted to harmless carbon dioxide and water vapor. Even the exhaust odors are eliminated. Developed by Oxy-Catalyst Inc., Wayne, Pa., some 3000 gasoline-driven fork trucks are in fume-free operation.

How It Works—Heart of the system is a cartridge containing 71 porcelain rods coated with 0.003 in. of catalytic platinum and alumina alloy. Rods are teardrop-shaped to minimize back pressure, and they are staggered to present maximum surface for combustion of the carbon monoxide and other harmful vapors as the exhaust flows across the rods.

Unconsumed carbon monoxide and hydrocarbons are oxidized at the surface of the rods. The catalyst permits combination of the exhaust contaminants with oxygen at a temperature lower than normally required for the reaction. In that way, combustion of the pollutants can take place well within the temperature ranges of exhaust gases.

Self-contained Units — The required number of catalytic cartridges is calculated on the basis of piston displacement. They are enclosed in an explosion-proof steel shell which can be bolted to the engine manifold in place of the standard muffler.

Units come in all sizes for both gasoline and LP gas-powered engines. Recent development of catalytic exhausts for 4-cycle diesel engines opens up that power source for use in close quarters, too.

Many equipment builders install the devices in the factory, but field installation can and is being done in many user plants.

TYPICAL TEST DATA

	IDLE SPEED		GOVERNED SPEED	
	Sample From Std. Muffler	Sample From Catalytic Unit	Sample From Std. Muffler	Sample From Catalytic Unit
Carbon dioxide, % by vol.	8.7	11.5	13.9	10.0
Oxygen, % by vol.	1.9	4.5	0.8	6.9
Carbon monoxide, % by vol.	7.4	0.02	0.5	0.004
Hydrogen, % by vol.	3.3	0.0	0.0	0.0
Nitrogen, % by difference	78.7	84.0	84.8	83.1
Air-to-fuel ratio of engine	11.3:1	11.3:1	15.3:1	15.3:1
Temp. on surface of exhaust, F.	180	360	245	360
Temp. of exhausting gases, F.	262	500	610	705
Gases discharged, scfm*	19.5	24.4	46.3	64.8
CO discharged, scfm*	0.144	0.0039	0.023	0.0018
% conversion	97.3		92.2	

*Standard cubic ft per min.

STEEL must have been dreaming of the Christmas holidays when it misstated W. R. Yorkey's company affiliation on p. 212 of the January 3 issue. Mr. Yorkey is sales manager of the Electric Controller & Mfg. Co. in Cleveland.

Count on WEIRTON

HIGH-CARBON STRIP
COLD-ROLLED SPRING STEEL

for uniform high-speed blanking and cold forming

Whether your problem is cold forming or blanking, you can depend on Weirton cold-rolled spring steel for best results. It has proved itself in a multitude of applications by consistently meeting the requirements of a variety of products where high fatigue-resistance is a principal factor.

Where superior forming qualities are of prime necessity, Weirton supplies spheroidized-annealed cold-rolled spring steel. The controlled grain structure provides exceptional ductility—assuring you of simple, economical fabrication.

Weirton also supplies cold-rolled spring steel that is temper rolled to produce controlled ranges of hardness and tensile strength. The desired ranges are designed to meet your specific requirements—assuring you of clean, economical blanking.

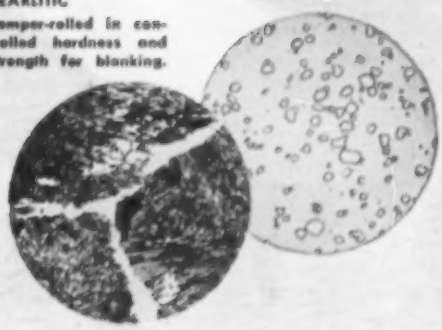
Close manufacturing control has resulted in these highly desirable qualities—unique in Weirton high carbon strip:

Accurate response to heat treatment.
Uniformity of gauge and width.
Uniform chemical and physical properties.
Exact consistency of grain structure.
Controlled decarburization limits.

Weirton high carbon strip is available with the desired chemical analysis and for specific heat treating and hardness ranges, in widths up to seven inches.

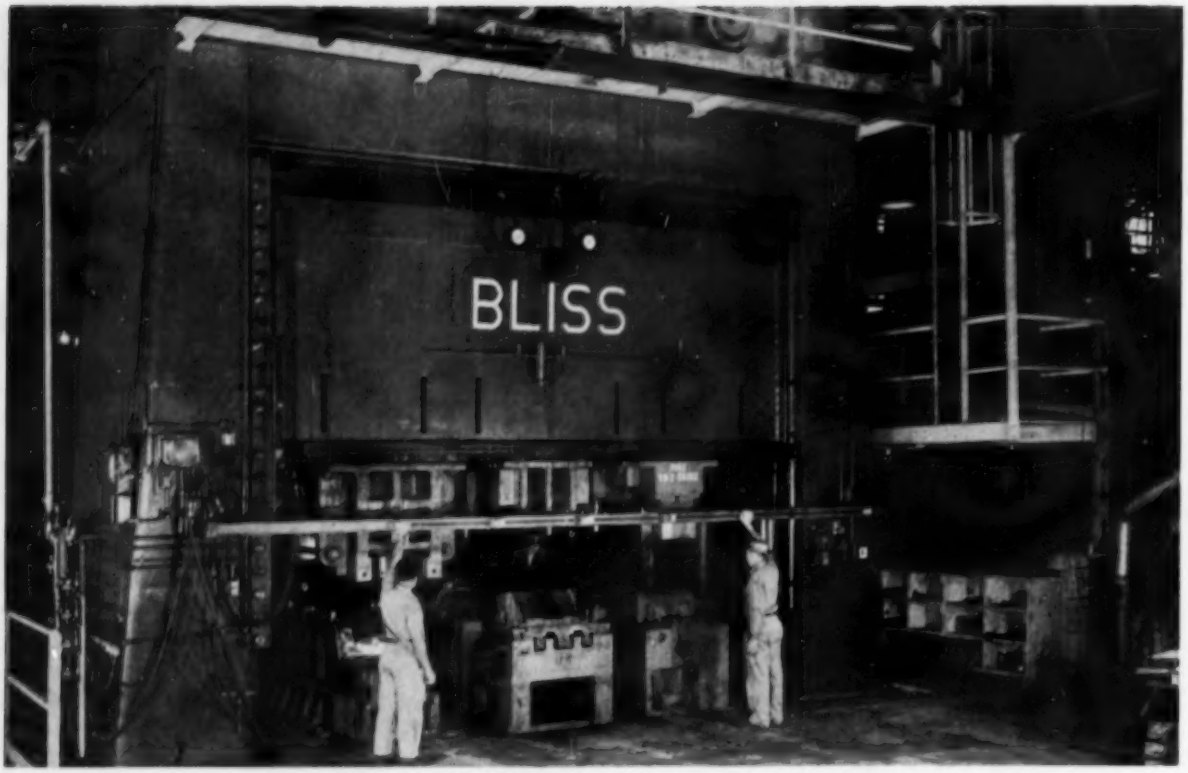
SPHEROIDIZED
Annealed, soft and ductile —ideal for cold forming operations.

PEARLITIC
Temper-rolled in controlled hardness and strength for blanking.



WEIRTON STEEL COMPANY
WEIRTON, WEST VIRGINIA

NATIONAL STEEL CORPORATION



Press produces automotive bumpers in a 3-stage die at six strokes a minute. It has a 40-in. stroke, 2000-ton capacity

Package Design for High Production

Wiring, controls and piping are built into these presses. They're designed for simple installation—built to be complete units in automatic forming lines

AUTOMATION is playing a major role in the redesign of standard machine tools.

One of the best examples to come along is a new line of presses just announced by E. W. Bliss Co., Canton, O. Although the presses will be standard models for Bliss, they are package units, built for automation lines in the automotive and appliance industries.

The design program, in which engineers from these two user industries co-operated, centered on single and multi-action designs for forming and drawing large stampings such as auto roofs, fenders and refrigerator doors. Bliss' investment in engineering alone amounted to hundreds of thousands of dollars. The program took some 3 years to complete.

Double Facets—Two recent concepts in sheet metal production gave impetus to the program. For one, the presses conform to JIC standards on bolster, bed, die and slide area and to blankholder and plunger dimensions. This means a user can make several sets of dies and ship them to distant plants knowing that the dies will fit. Also, standard dimensions for mounting make it possible to move the presses easily during model changeovers and to switch them from one press line to another in case of breakdowns.

The other concept is the one of designing presses from the ground up for automation. Heretofore, as plants moved toward the mechanized factory, automatic handling machinery often was simply attached to a press until, Bliss says, "It looked like a Christmas tree."

Inside—On the new line, wiring, piping and controls are built into the frame (see p. 93, this issue). Power and air line takeoffs are built into the uprights. Hooking up load-unload equipment is simplified.

Two of the models are underdriven—they're lower, can be used in lower buildings, are easier to maintain.

going down the drain... need help?

Call your nearest

J&L STEEL WAREHOUSE

for a complete line of steels

SPECIALS: Jalloy (Abrasion and Impact Resistance) Jalten (High Strength—Good Formability—Lighter Weight) Junior Beams • Junior Channels • Jaltread Floor Plate • Tool Steels • Stainless Steels.

STANDARD PRODUCTS: Hot Rolled and Cold Finished Bars and Shapes. Structural Shapes • Carbon and Hi-Tensile Plates • Hot and Cold Rolled Strip and Sheets • Wire Products • "Precisionbilt" Wire Rope.

for service that solves your problems

TECHNICAL SERVICE: Experienced J&L Metallurgists to help you with analyses and recommendations.

FABRICATION SERVICE: Shearing, forming, torch cutting, blanking, to *your* specifications.

J&L STEEL

Jones & Laughlin

STEEL CORPORATION — *Warehouse Division*

Constant testing keeps quality high . . .

When Welded Tubing Must Take It

QUALITY CONTROL has a corollary—customer confidence.

At Babcock & Wilcox Co. they like to think that confidence in electric-resistance-welded pressure tubing continues through just such a cause and effect relationship.

Incoming Material—The raw material for electric-resistance-welded steel tubing is hot-rolled mill-edge coiled strip. Immediately on receipt of a truck or rail shipment at the Alliance, O., plant, a strip inspector, under metallurgical department control, cuts samples on a percentage basis covering each heat and size on the shipment. Samples are identified by heat number and shipment, checked for hardness, thickness and width and results recorded.

Samples go to a centrally located laboratory where the scale is pickled off. They are milled from the full cross-section to be chemically analyzed.

Lab Check—Strip sections are macroetched and examined for pattern, structure and defects such as undue segregation, pipe, seams and slivers. Coils showing such defects are rejected, and a larger percentage of samples examined.

Pickling provides an opportunity to examine every coil visually for surface defects, shape, thickness and width. Ends are examined for evidence of pipe. Coils exhibiting defects or dimensional inaccuracies which would result in defective tubes are rejected.

Slitting and Rolling—After butt-welding the coils end to end, the strip is slit on each edge to uniform width by a rotary slitter, preset for each size and gage in the plant tool room. Slitting just prior to forming and welding assures uniformity of width which is essential to uniform shape and a consistently sound weld.

At the time the strip is received, each heat is assigned a three-letter heat code such as AAA, AAB, etc. After pickling, this identification is stenciled on the coils as well as the size, gage and operator's initials.

A fully equipped roll shop makes and maintains the rolls which form the tubing from flat strip. Contours are checked on each roll after every long run of a size.

The Weld—Following forming of the strip into an open cylinder, the seam is welded together under a pair of revolving electrodes. Here the guarantee of a good weld is undeviating control of the welding unit.

The inspector at each welding mill has the duty of making tests to guarantee this standard. On him lies the responsibility of checking surface, dimensional accuracy and weld quality.

Weld Check—Weld quality is checked destructively and non-destructively. Specifications require that pressure tubing, after normalizing, pass deformation tests

of the flange, flattening, reverse flattening and, in some cases, crush type. These are made on the as-welded tube.

In addition, long lengths are regularly tested nondestructively by the Magnaglo wet method. The laboratory also checks sample tubes from each order, heat number, size and gage.

Heat Treat—Normalizing heat treatment follows welding for all tubes for pressure use. Furnaces in which this is done are under supervision of the metallurgical department, facilitating close control of time and temperature.

Crop ends cut from the tubes to bring them to ordered length are submitted to the laboratory from each heat of steel, size, and gage. These are examined for completeness of recrystallization, a close check on heat treatment. Other crop ends are subjected to deformation tests.

Hydrostatic Test—After straightening, cutting to length and facing on the ends, all pressure tubes are hydrostatically tested at an internal pressure which stresses the material to 80 per cent of its yield point. A timing device shows the operators of the testing equipment when the tube is at pressure and when it has been held for the correct length of time. During pressure time, each tube is struck with a mallet to give it additional shocks.

If a leak is detected, the two lifts preceding and the two lifts following it in production sequence may be retested for a longer time to satisfy the inspectors that quality is maintained. A lift number assigned to each bundle of tubes at the welding mill identifies it through processing.

Surface Checks—A team of two inspectors goes over each tube for surface quality, dimensional accuracy and mechanical mars, both interior and exterior. They apply the stencil marking to the individual tubes identifying them as to size, gage, length, heat number, specifications, etc. To instill pride of workmanship, inspectors are required to add their own initials.

At the end of all this checking is a length of tubing that must carry the reputation of a company on its back.

Long dipping basket shows how Boeing perfoms . . .

Conversion Coating by the Yard

THE LONG DIP at Boeing Airplane Co.'s Seattle plant is a matter of distance. That company has installed a series of tanks (each 80 ft long) for giving aluminum airframe members an anticorrosion coating.

The long dip is a matter of time, too. By using chemical conversion instead of electrolytic coating the company figures it can reduce coating time by nearly a third.

Plenty Big — Eight tanks are lined up side by side. They are 5 ft wide, 5 ft deep for half their length and 10½-ft deep the rest of the way. Each holds 20,000 gal.

The tanks will take 76-ft spars and whole B-52 wing panels. Smaller parts are dipped in long stainless steel baskets handled by two overhead cranes.

Sequence—Treatment is the Alodine process which gives aluminum an amorphous phosphate coating. Tanks, in order of dipping, are: 1. Alkaline cleaner. 2. Water rinse. 3. Nitric-phosphoric acid deoxidizing bath. 4. Water rinse. 5. Conversion dip. 6. Water rinse. 7. Sealer (fixing and hardening) dip. 8. Drying.

In a little more than an hour, a load (sometimes more than 100 pieces) can be put through the sequence. Parts when dry have a surface suitable for painting.

Savings—A smaller installation at its Wichita division convinced Boeing that the process offered savings of at least $300,000 a year over anodizing. At that rate it won't take long to amortize the $340,000 cost of the Seattle installation.

The savings will come about through reduced costs of heat, water, power, compressed air, labor and reduced process time. There's one other important saving: A scratch in the coating is easy to repair, in contrast with a damaged anodic coating which would have to be stripped and replated.

Here are some benefits Union Metal realized through its unit load handling system:

Increased production at 10 press operations an average of 37.4 per cent by positioning a continuous parts supply at work-level height.

Increased warehouse storage capacity 33.3 per cent in the same floor space with more compactly designed and tiered containers.

Reduced scrap-loading costs 87.5 per cent with mechanically-dumped unit-load containers.

Saved 62.5 per cent of manhours formerly required for cupola charging by unitizing the charges and mechanizing the entire operation.

Bolster and straddle truck system unitizes handling of large tube stock. In the process, two mobile yard cranes, a fleet of four-wheel trailers and seven tractors were eliminated.

Picked up a 93.8 per cent manhour savings by mechanizing removal of used core sand and wires from the foundry's cleaning room floor.

Extended the principle to cover hard-to-handle materials—long shear trimmings, steel bar stock, blanking skeletons, gas and oxygen cylinders—with skids, pallet racks and other containers.

Right Container Keeps Parts on Schedule

Built-in handling resources and ability to plan their use take the pressure off multiproduct processing. Unitizing principle is extended throughout operations

BROAD DIVERSIFICATION of product almost guarantees in-process handling problems. A firm like Union Metal Mfg. Co., which turns out a line of equipment that runs through ship booms, street lighting standards, switch boxes and commercial castings, is in for trouble unless it pays sharp attention to handling techniques.

Fortunately, Union Metal has handling resources built into its production operations. One of the most important among its many products is a line of container-type handling equipment.

Unit loading is applied to almost all material passing through the plants. It's work-positioned, tiered, mechanically dumped and transported in unit loads.

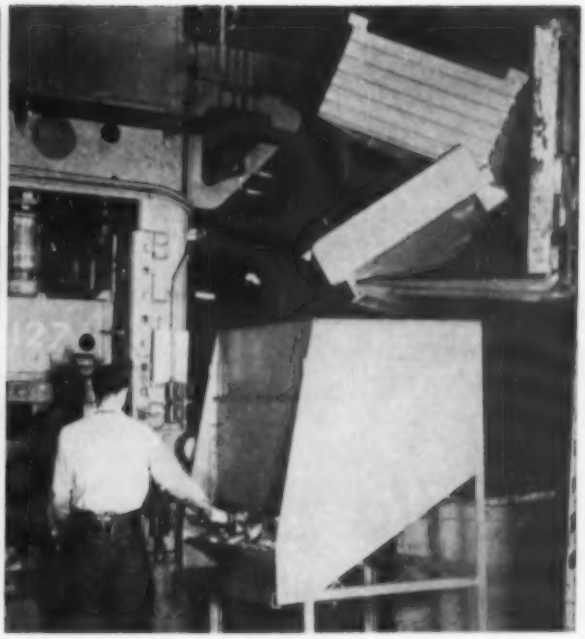
Work Positioning—Materials for all fast, repetitive press and drilling operations are work positioned to eliminate lost time and motion and avoid shutdowns while operations wait for parts. Union Metal uses two units—their own Work-O-Matic drop-bottom box and its positioning stand. Boxes are fork-lifted onto the stand, and the box's hinged bottom is lowered as forks are withdrawn, allowing parts to flow into the tray. Gravity-fed hoppers — one-piece versions of the box and stand—position work on longer machine runs.

Pallet racks are also used for positioning and storing formed threaded anchor rods. These are double-corrugated, twin-deck, steel pallets staked on two sides. Double-locking tiering angles at all four corners insure safe stacking. Fork slots provide four-way entry.

Storage—Handling materials in unit loads in tierable containers means vertical air space is utilized fully. Previously, most materials were handled and stored with steel-bound wooden skids equipped with stake pockets. Maintenance and inability to tier were their chief problems. Fittings and castings from 30-lb lamp standard bases to fabricated transformer cases are palletized and stacked.

An end-loading scoop attachment collects used core sand and wires. Scoop is attached in about 1 minute

All tubing at Union Metal is handled by straddle truck with bolsters. It's safer and faster than crane operation



A compact, gravity-fed hopper is used to work-position parts at longer, repetitive press jobs

The double corrugated pallets take 18 transformer bases while the old skids held only 12.

Skid boxes of in-process stampings and other parts previously were tiered three high in storage. Most of them have been replaced with the drop-bottom boxes, which have the same capacity and can be tiered four-high. Warehouse capacity is upped 33.3 per cent. There's little rehandling because the same containers serve for in-process storage, feeding and receiving parts at work points, transporting material and occasionally for dumping.

To unitize long steel bar stock, Union Metal uses rack skids. These are inverted skids with riveted crane lugs at all four corners. They can be tiered ten high.

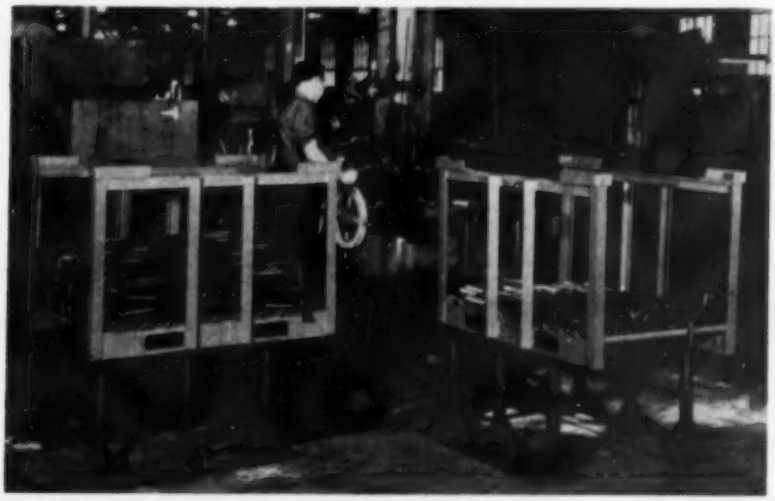
Scrap Handling—The company mechanized scrap handling by using fork trucks and three types of mechanically-dumped containers. Small scrap is handled with the same boxes that are used for work positioning. Boxes are fork-lifted from production to scrap accumulation areas, where they're tiered until a truck load is collected.

Long pieces of scrap are handled in corrugated steel, open-end trays. A tray placed behind a shear catches trimmings and when loaded is trucked to the scrap accumulation area and tiered.

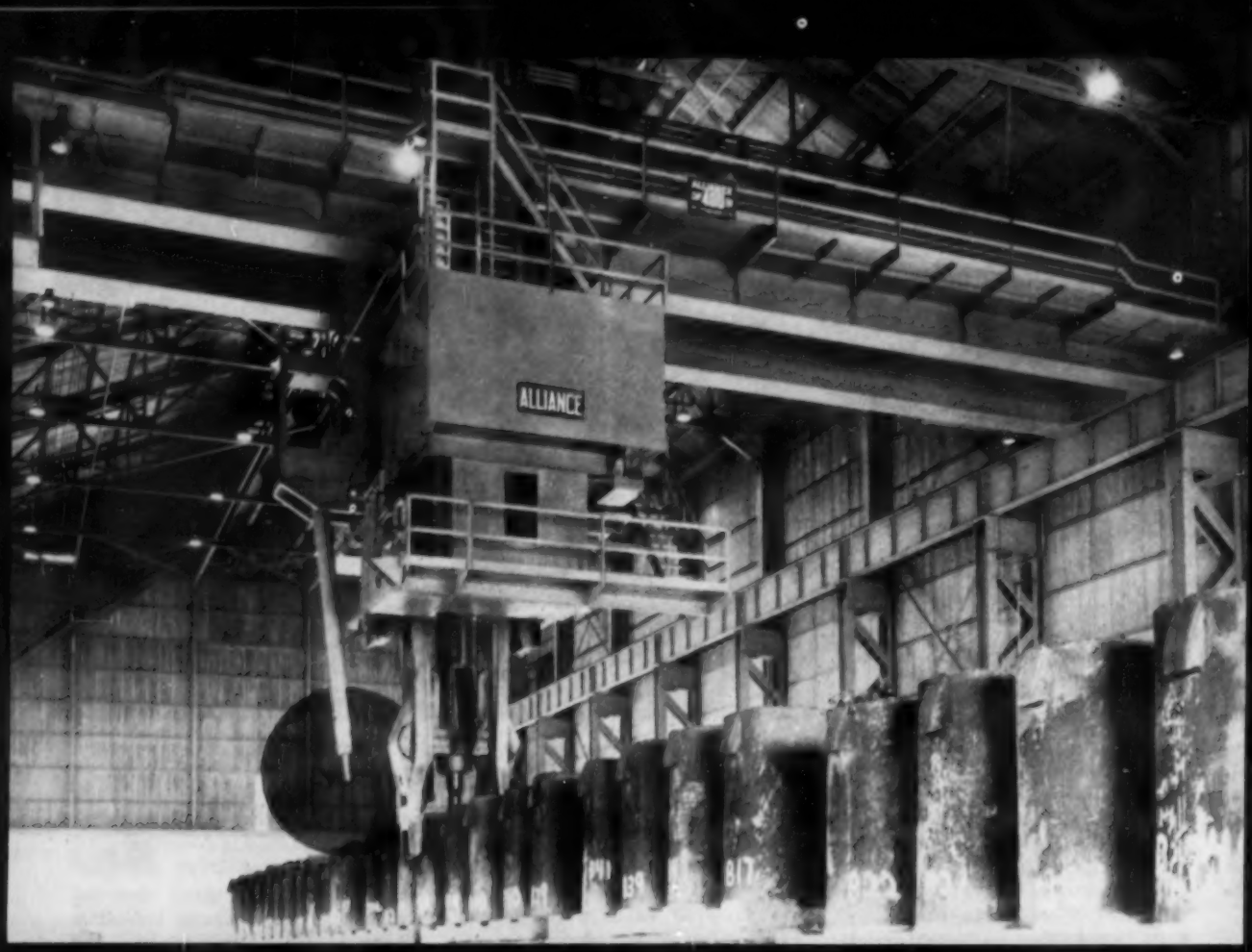
In the foundry, metal scrap, pig iron and coke charges for the cupola are prepared in unit loads and weighed in drop bottom boxes on a mobile scale carried on a fork truck. Box loads are dumped into a floor-positioned charging bucket and elevated to the cupola top by an electric remote-control system.

Handling Tube Stock—Tubes for ship masts, lighting standards and construction pilings are handled in horizontal unit loads by straddle trucks with bolsters.

To make the bolster setup work they're loaded and unloaded by overhead crane in the plant and straddle trucked between plant and storage. And tubing is easily accessible. The big yard crane used to load tubes onto highway trailers has given way to a truck with special fork attachment: At the end of a mast-type extension attached perpendicularly to the forks, a cable-controlled ice-tong device grasps the tube.



Pallet racks containing street lighting anchor base rods are work-positioned on jack stands at threading machines



IMPACT STOOL LOOSENER

REDUCES WEAR ON STRIPPER CRANES

The big 400-ton Alliance push-pull Stripper Crane exerts 2,400,000 pounds' pressure to strip moulds from ingots cleanly and frees stool stickers at the same time. It's done with the patented Impact Stool Loosener. It reduces wear on stripper cranes, eliminates jiggling by crane, sends ingots to the mill ready to go . . . no need to loosen them with soaking pit cranes. The Alliance Impact Stool Loosener can be installed on any stripper crane. Big Alliance strippers, with a nameplate rating of 400 tons and overload rating of 1200 tons, embody many exclusive design features . . . a result of Alliance's knowledge of mill procedures and problems. Have Alliance analyze your lifting needs. A letter, wire or phone call brings the information you require.

World's Largest Builders of the World's Largest Cranes

THE *Alliance* MACHINE COMPANY

MAIN OFFICE: ALLIANCE, OHIO

LADLE CRANES • GANTRY CRANES • FORGING MANIPULATORS • SOAKING PIT CRANES • STRIPPER CRANES • SLAB AND BILLET CHARGING MACHINES • OPEN HEARTH CHARGING MACHINES • SPECIAL MILL MACHINERY • STRUCTURAL FABRICATION • COKE PUSHERS

Give Us The Runway And We'll Lift The World

NEW PRODUCTS and equipment

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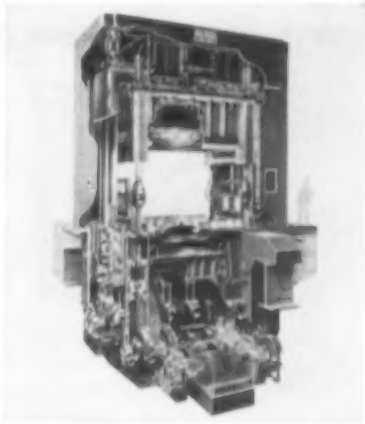
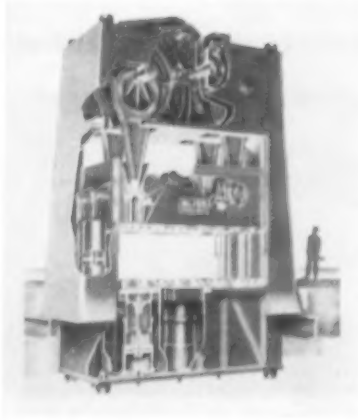
New Line of Streamlined Enclosed Presses

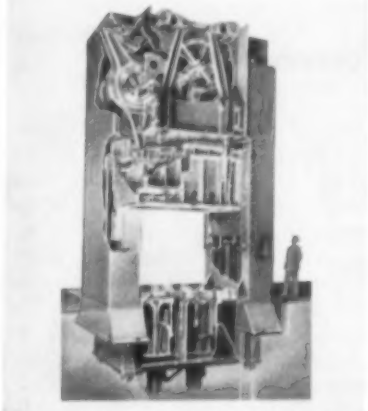
All controls, wiring, piping, power and air-line takeoffs are built into the uprights. The presses are easy to equip with automatic feeding and unloading machinery. Cranes can come right up without fear of snagging overhead pipes or wires or bumping into built-up crowns. Electric controls and pipes are already positioned. Only in-plant connections need to be made. Air counter-balance cylinders built into the uprights cut crown height.

Four-piece shrunk tie-rod construction is keyed for accurate alignment. Crowns are deeper and include the bottom of main gears which add to crown strength and simplify automatic lubrication. This press (bottom photo) is double-geared with four main gears operating fully eccentric. It is driven through a pneumatic friction clutch at speeds up to 10 strokes per minute.

The TU-4 (photo top last column) is a four-point, triple-action, underdrive press. Drive is direct, through an electric motor with interlocked air brake. Crankshafts drive both plunger and blankholder through a single toggle mechanism. The 2000-ton S-4 (photo bottom last column) was designed for work with deep front-to-back dimensions. It is distinguished by its use of four main gears (with eccentric gears on one side of each main gear) and by its packaged design, which suits it for automation. Specifications are in accordance with JIC standards. For more details see the story on page 86. E. W. Bliss Co.

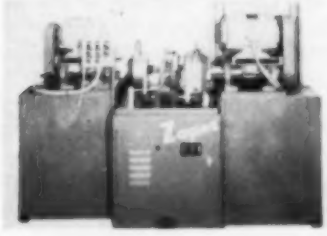






FOR MORE DATA CIRCLE REPLY CARD NO. 1

Machine Drills, Countersinks Holes on Rod



This horizontal drilling machine produces steel inserts (sprags) 3/8 in. square for an automatic transmission assembly. It is also used on a wide variety of setups. Interlocked electrically for automatic operation, it has two hydraulic feeder units and two gearless drill heads. Twenty holes are drilled from one side in a rectangular rod at the first station, 20 holes from both sides at the second station. The bar is indexed progressively until a 10-ft piece is completely drilled. It is then put through an automatic punch press.

The machine has a potential production of 3600 holes per hour. Tooling can be adapted to many jobs. Zagar Tool Inc.

FOR MORE DATA CIRCLE REPLY CARD NO. 2

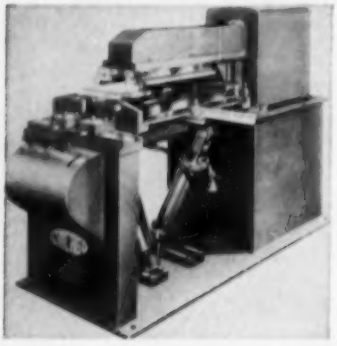
Special Machine Tool Processes Connecting Rods

A dial type, it has six stations. One station is for loading, two for drilling, one for chamfering, one for milling and one for reaming. The machine completes 52 operations per part. It drills, reams and chamfers bolt holes; drills, reams and chamfers the piston pin hole and mills the lock slot.

The index table is fluid-motor driven. Work holding fixtures are hydraulically fed. Electrical and hydraulic construction is to JIC standards. All standard and special parts are completely interchangeable for easy maintenance and to provide flexibility for part design changes. Other features include hardened and ground ways, an automatic coolant system, hydraulic feed and rapid traverse. Cross Co.

FOR MORE DATA CIRCLE REPLY CARD NO 3

Folder Brakes With Automatic Operating Cycle



The brakes are made in a single-wing model, a double-wing model with open throat and fixed head and a double-wing model with open throat and moving head. They are built to individual requirements and may be had as a single-purpose machine or to handle a variety of sizes or products. Pneumatic, hydraulic or mechanical operation is offered. These machines are being used by many appliance manufacturers for tangent bending and folding on casings and other parts of a variety of appliances.

The model 638 is illustrated. It is the open-throat moving-head type. The low head is particularly suited to forming small, closed wrap-arounds. Dreis & Krump Mfg. Co.

FOR MORE DATA CIRCLE REPLY CARD NO 4

Surface-treating Material Protects Concrete

A thermosetting plastic-base surfacing, Ceilcrete B can be applied to floors, trenches, tank bases and other concrete structures. A minimum coating of ⅛-in. provides a monolithic membrane impervious to solutions containing hydrofluoric acid. It's for application where resistance to abrasion, impact and acids is important.

In many applications, the material has replaced brick. It has been successfully used for lining pickling-tank pits where hydrofluoric acid is used. It can be used in a wide variety of installations. Only a few chemicals have a marked corrosive effect on it. Ceilcote Co.

FOR MORE DATA CIRCLE REPLY CARD NO 5

Pallet Truck Handles 6000-lb Loads

It is capable of handling 48-in. long pallets in 6 ft −0 in. aisles. The over-all length of the short-coupled JackLift electric is only 25⅞ in. longer than the fork length. It comes in capacities up to 6000 lb in seven fork lengths, 32, 36, 40, 42, 48, 54 and 60 in.; Fork widths are 25, 27 and 30 in. It can handle single and double face pallets and skid platforms. The height to the top of the fork in its lowered position is 3¼ in.; raised, its height is 7¼ in.

The drive unit is a double reduction gear drive, with traction speeds of 3.0 mph empty and 2.3 mph loaded. The brake is spring applied and electrically released. The electro-hydraulic lifting mechanism is a high pressure system. Lewis-Shepard Products Inc.

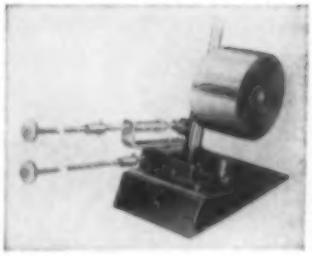
FOR MORE DATA CIRCLE REPLY CARD NO. 6

Bench-model Abrasive-belt Backstand Designed for Production Work

Model 524 will convert your grinder or polisher into a fast-cutting time-saving abrasive-belt machine. For light polishing or deburring, belts up to 4 in. wide can be used. A mounting bracket for floor or wall mounting is available. Extension controls for tracking and tensioning can be furnished so adjustments can be made at the operator's working position.

The model supplements the company's line of abrasive-belt backstands. Ten other models of spring and air-tensioned backstands are in the line. Hammond Machinery Builders Inc.

FOR MORE DATA CIRCLE REPLY CARD NO 7



Balance Stand for Vibration Analyzers

The analyzer is instantly detachable from the stand. It balances armatures, gears, flywheels, sheaves etc., to vibration tolerances as fine as 0.00025 in. It features mechanical plane separation to eliminate the cross effect of imbalance from one end of a rotor to another.

The 75-lb bench-mounted stand includes two freely suspended saddle supports to hold the part being balanced, two sensitive velocity pickups, a selector switch and a structural frame with adjustable length between saddle supports. It has a capacity from 30 to 500 lbs. Parts up to 24 in. in diameter and 4 ft 3 in. in length can be accommodated without modification. International Research & Development Corp.

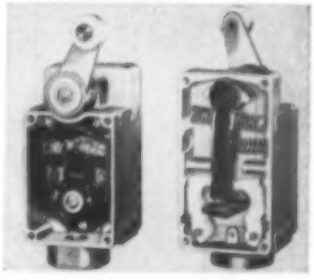
FOR MORE DATA CIRCLE REPLY CARD NO 8

Limit Switch Has Nylon-to-steel Wearing Surfaces

Features of the Type-DM machine-limit switch include increased wiring space and protection against excessive overtravel achieved without shear pins. Electrical and mechanical mechanisms are completely separated. The switch is rated at 10 amp continuous capacity up to 600 v ac, 550 v dc. It is available with ½ or ¾-in. conduit connections.

The overtravel mechanism has two sets of double-concentric coil springs, permitting continuous 30-degree overtravel without increasing maintenance problems or shortening life. These and all other springs are in compression to make operating as nearly fail-safe as possible. A variety of front and reverse-lever mounting arrangements can be made with six optional back-cover plates. Clark Controller Co.

FOR MORE DATA CIRCLE REPLY CARD NO 9

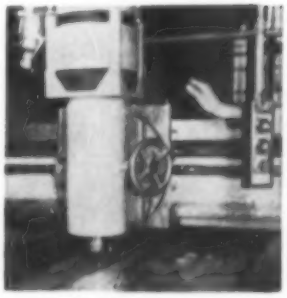


Motorized Spindle for Conversion to High-speed Carbide Milling

The milling spindle is driven by a 20-hp 1200-rpm glass-wound fan-cooled motor. It is connected directly to the rotor to eliminate all gears. It can be vertically adjusted on ways. Four table feeds range from 30 to 120 ipm. A Loadmeter will shut off the feed motors if the spindle is overloaded.

A standard 4-in. Futurmill cutter with eight octagonal solid-carbide blades (illustrated) is used to machine a 23 x 23-in. mild-steel block to a depth of ⅛-in., with seven cuts at 60 ipm. The blades in the cutter can be quickly indexed to set up a new cutting edge. After the 16 cutting edges are dull, the blades can be sent back to the factory for regrinding. Detroit Milling Cutter Co.

FOR MORE DATA CIRCLE REPLY CARD NO 10



Self-laying Track Dolly Moves Heavy Machinery

The Multiton is designed for inordinate weights and will handle as much as 50 tons. Using the self-laying track principle, the floor becomes the centerpiece of the frame. Imperfections do not hinder the movement of the dolly. In addition to its use for moving heavy machinery and components, the skids have been used to move machinery and other equipment down a manufacturing assembly line.

The photo shows a truck pulling a machine mounted on three of the skids. The man is steering a single rear unit to follow the truck's course. Stokvis-Edera & Co. Inc.

FOR MORE DATA CIRCLE REPLY CARD NO. 11

Shelving Meets Any Storage Problem

Components and assemblies are completely interchangeable and allow more than 1000 combinations. Units for the storage of tools, parts, books or any long-term storage items can be bolted side-by-side for any desired length. They also can be bolted back-to-back. Bolts and nuts are cadmium plated. The shelving comes in green enamel, with or without sides.

There are 35 sizes from 24 x 9 in. to 48 x 36 in. The shelves are 18-gage steel. Posts (11 or 13 gage) can be had in heights of 3 ft, 3 in. to 10 ft, 3 in. by 1-ft increments. Standard Pressed Steel Co.

FOR MORE DATA CIRCLE REPLY CARD NO. 12

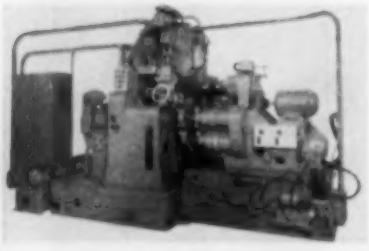
Self-contained Motor-driven Floor Lathe Combines Two Advantages

Designed to combine floor mounting with the economy of bench-lathe construction, the 12-speed self-contained motor-drive unit is permanently mounted in the back of the lathe headstock. Approximate spindle speeds are 48 to 1435 rpm for the 10-in. lathe and 50 to 1270 rpm for the 9-in. lathe. Direct belt drive to the spindle assures smooth operation.

Heavy cast-iron legs provide rigid support for the lathe bed. The chip pan is of welded steel construction, with roll rim all around the edge. Four bed lengths are available, providing distances between centers ranging from 16 in. to 34 in. The 9-in. lathes take work up to 9¼-in. in diameter over the bed and 5½-in. over the saddle cross slide. Maximum swing for the 10-in. lathes is 10 in. over the bed and 6¼-in. over cross slide. South Bend Lathe Works

FOR MORE DATA CIRCLE REPLY CARD NO. 13

Machine Drills, Taps and Chamfers Pump Holes



This special 9-station drum-type machine has a cluster-style head designed to operate high-speed cutting tools at maximum speeds. Different pump models are interchanged on the machine by substituting the proper auxiliary head for different bolt circles. Composed of right and left stations, the machine cycles in 21 seconds.

Of basic BarnesdriL unit-type construction, it consists of one 30-hp unit with a 38-spindle head, two 1½-hp units with one single spindle and one 2-spindle head, two drilling units, one single-spindle lead-screw tapping unit and one 15-spindle lead-screw tapping unit. Barnes Drill Co.

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FREE LITERATURE

Catalogs and Clip Sheets

Use these reply cards to bring you free literature, editorial clips or more information on new products and equipment described or advertised in this issue.

Metal Finishing

MacDermid Inc. offers a booklet of 31 technical data sheets on compounds and equipment for metal finishing. Included are: Cleaning copper, steel and die castings; copper plating; cleaning aluminum for spot welding; immersion stripping of copper and nickel; plating on aluminum; chemical polish for copper and steel; phosphate coating; alkaline rust remover and deruster; aluminum bright dip; black oxidizing; reducing acid mists.

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Grinding Wheels

Colonial Abrasive Products Co. describes its reinforced wheels for high-speed portable grinding with Grindaway safety rings—4 pages.

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Furnaces

Industrial Heating Equipment Co. offers "Continuous-type Circ-Air Recirculating Furnaces" and "Controlled Atmosphere Furnaces" —Bulletins No. 13-A and No. 19, 4 pages each.

FOR A FREE COPY CIRCLE REPLY CARD NO. 17

Tubing

Trent Tube Co., subsidiary, Crucible Steel Co. of America, offers "Trentweld Stainless and High Alloy Tubing." It illustrates and describes the company's manufacturing methods from metallurgical testing through final inspection—48 pages.

FOR A FREE COPY CIRCLE REPLY CARD NO. 18

Product Catalog

Kewanee-Ross Corp. details its line of high and low-pressure steel boilers for commercial, industrial and residential use—32 pages.

FOR A FREE COPY CIRCLE REPLY CARD NO. 19

Gear Hobber

Michigan Tool Co. details the model-1445 ultraspeed gear hobber. Information is given on machine design, construction details and specifications—Bulletin LH-54, 7 pages.

FOR A FREE COPY CIRCLE REPLY CARD NO. 20

Industrial Safety

A new general catalog (55B) on industrial safety equipment is available free from Willson Products Inc. This new, easy-to-read, fully-illustrated catalog is designed as a workable, everyday manual.

The catalog is divided into four major sections: Eye protection; head protection; respiratory protection; welding. Illustrations, descriptions and ordering information have been correlated for simplicity and practicability. All who have an interest in industrial safety will find this new catalog a reference book of great interest and value.

FOR A FREE COPY CIRCLE REPLY CARD NO. 21

Steel, Alloy Plate

Nooter Corp. describes in words and pictures its facilities and workscope. Corrosion data tables for various metals are included—Catalog No. 554, 48 pages.

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Resins, Hardeners

Bakelite Co., division, Union Carbide & Carbon Corp., describes the use of C-8 epoxy resins for tools, dies, jigs, fixtures, adhesives, laminating, casting, potting, embedding and capsulating—15 pages.

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Welding

Eutectic Welding Alloys Corp.'s "More Profits from Welding" explains how its low-heat-input metal-joining process improves on conventional welding in job shops—Folder TIS 2328, 4 pages.

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High-speed Gears

Technical Products Co. Inc. describes its services in the science of Geartronics. Facilities are available

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6	16	26	36	46	56	66	76	86
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to solve high-speed gear problems in electrical, electronic and mechanical industries—6 pages.

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Aluminum

Aluminum Co. of America discusses the architectural trend to metal in "Alcoa Aluminum Industrial Building Products."

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Automation Lighting

Wil-son Mfg. Co. explains Cablematic lighting and advances 20 reasons why it obsoletes ladder lighting—12 pages.

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Stainless Tubing, Pipe

Carpenter Steel Co. details 11 types of stainless tubing and pipe fabrication—36 pages.

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Multipresses

Denison Engineering Co. shows how manufacturing problems can be solved using its hydraulic multipress. Material on hydraulic pumps, controls, fluid motors and valves is included—Catalog 120-C, 24 pages.

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Switches

Micro Switch Division, Minneapolis-Honeywell Regulator Co., describes ten classifications of its standard line of phenolic-enclosed precision snap-action basic switches —Catalog 62, 28 pages.

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Cleaning, Finishing

American Wheelabrator & Equipment Co. deals with the wet abrassive blasting process. Forty applications where this process can be profitable are listed—Bulletin 541-D, 18 pages.

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Plastics

B. F. Goodrich Co. offers a data sheet on plastisols (liquid vinyl plastics) and the products made from them.

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Thermocouple

Leeds & Northrup Co. details its immersion thermocouple that enables operators of open hearth and electric furnaces to measure bath temperatures on a full-time operating basis — Process Data Sheet 643 (1), 4 pages.

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Metal Strippers

Enthone Inc. describes its Enstrips (materials for selective stripping of one metal from another). A chart indicates the proper stripper for a given job—4 pages.

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Warehousing Facilities

Railway Warehouses Inc. describes its extensive warehousing facilities. A special section illustrates and describes the company's material handling equipment and methods—4 pages.

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EDITORIAL REPRINTS:

Office Automation

Rapid developments in electronics are raising management enthusiasm for a more efficient office operation. Speed and efficiency provide possibility of restoring the balance between production and paper work, (p. 37).

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Heat Treating Tools

During the next few weeks, STEEL will present a series of articles dealing with the development of needed properties for tools by heat treating. On p. 70, the series begins with a discussion of water hardening types.

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Zirconium and Corrosion

Zirconium may be the answer to your corrosion problems, says the article on p. 74. Thanks to atomic energy needs, the supply is now adequate for any reasonable commercial use. The price is still high, but only small quantities are necessary to curb corrosion. Here's its description.

FOR A FREE COPY CIRCLE REPLY CARD NO. 38

Stainless

Rotary Electric has gone into the stainless specialty bar business. A batch-type, roller-hearth annealing furnace is considered the key component in its processing shop. On p. 76, you'll find a description of their production methods.

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January 24, 1955

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STEEL
January 24, 1955

Market Outlook

DON'T DESPAIR over supply tightness in some forms of steel.

The current squeeze is not likely to get tighter.

Much of the strength in demand stems from the automobile industry. Most everyone expects auto requirements to ease about midyear, but some of the pressure will be softened before that time by two things: 1. Steel industry efforts to relieve hardship cases. 2. Increased shipments of finished steel.

FLEXIBILITY—Relief in hardship cases is being achieved by care in booking orders. Steel producers are trying to leave spots open to accommodate orders from customers who need immediate delivery. Republic Steel Corp. quit listing delivery times on flat-rolled products on its weekly report of steel availability. It had been showing the number of weeks it needed to deliver 11 flat-rolled products. When delivery times lengthened, Republic became reluctant to be specific. In some cases it could make delivery sooner than the average. The company didn't want to scare orders away.

Inland Steel Co. made a similar move some time ago.

TURNING POINT—The increase in shipments of finished steel should be noticeable from here on. Ingot production has been up for several months, but shipments of finished steel have not kept pace. Before they could boost shipments of finished steel, mills had to build up stocks of semifinished. Ordinarily, mill shipments of finished steel are 72 to 75 per cent of ingot output. The remaining 25 to 28 per cent is lost as scrap. But in October and November, latest months for which shipments figures are available, only 65 per cent of ingot output was shipped as finished steel. This means mills were putting a good many ingots into a build-up of semifinished steel, particularly slabs for the light, flat-rolled products.

TURNABOUT—Part of the increased demand for steel comes from a move to restore inventories. Bay E. Estes, director of commercial research for U. S. Steel Corp., thinks rebuilding of stocks by consumers will push steel shipments 2 to 3 per cent above usage this year.

Even with inventory rebuilding, the demand for steel is apt to level off or even decline about midyear. The biggest customer for steel—the automobile industry—is conceded to be making a production push before possible automotive strikes at the end of May.

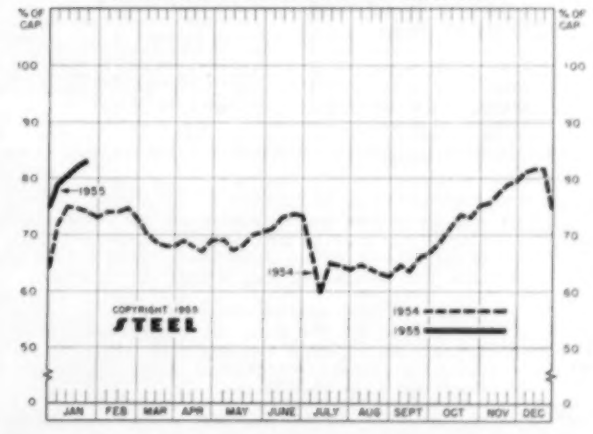
CUSHION—Cushioning a decline in steel demand from the auto industry may be seasonal upturns in other industries, such as construction.

Even if there is a decline in automotive demand for steel, the total demand this year for it should exceed that of last year, when consumers were drawing upon their inventories for tonnage. Now, with their inventories down, they have to buy at least as much as they use. This is reflected in mills' current operating rates.

OUTPUT UP—In the week ended Jan. 23, ingot output was at 83 per cent of this year's increased capacity. A year ago, the rate was only 74 per cent. In the week ended Jan. 16, the rate was 82 per cent.

Markets are steady pricewise.

NATIONAL STEELWORKS OPERATIONS



DISTRICT INGOT RATES

(Percentage of capacity engaged)

	Week Ended Jan. 23	Change	Same Week 1954	Same Week 1953
Pittsburgh	78	— 2*	83.5	104.5
Chicago	85.5	+ 1.5*	81	105.5
Mid-Atlantic	77	+ 1	82	95
Youngstown	88	+ 2	70	106
Wheeling	95.5	+ 1	81	103.5
Cleveland	87.5	— 8.5*	83	100
Buffalo	100	0	71	106.5
Birmingham	74	0	87	106
New England	78	+ 3	60	90
Cincinnati	81.5	— 2	69.5	93.5
St. Louis	87.5	+ 9.5	65	101
Detroit	89	+ 1	89	104.5
Western	84	+ 8	80	105.5
National Rate	83	+ 1	74	99.5

INGOT PRODUCTION‡

	Week Ended Jan. 23	Week Ago	Month Ago	Year Ago
INDEX (1947-1949=100)	123.8†	124.9	107.4	109.9
NET TONS (In thousands)	1,989†	2,097	1,726	1,766

*Change from preceding week's revised rate. †Estimated. ‡Amer. Iron & Steel Institute. Weekly capacity (net tons): 2,413,278 in 1955; 2,384,549 in 1954; 2,254,459 in 1953.

Metalworking Outlook—p. 31 Technical Outlook—p. 69

Price Indexes and Composites

FINISHED STEEL PRICE INDEX (Bureau of Labor Statistics)

	Jan. 18 1955	Jan. 11 1955	Month Ago	Dec. Average
(1947-1949=100)	144.7	144.6	144.6	144.7

AVERAGE PRICES OF STEEL (Bureau of Labor Statistics)

Week Ended Jan. 18

Prices include mill base prices and typical extras and deductions. Units are 100 lb except where otherwise noted in parentheses. For complete description of the following products and extras and deductions applicable to them write to STEEL.

Rails, standard, No. 1	$4.525	Sheets, electrical	$9.350
Rails, light, 40 lb	5.917	Strip, C.R., carbon	7.493
Tie Plates	5.275	Strip, C.R., stainless, 430 (lb)	0.415
Axles, railway	7.500	Strip, H.R., carbon	5.113
Wheels, freight car, 33 in. (per wheel)	15.500	Pipe, black, buttweld (100 ft)	15.000
Plates, carbon	4.675	Pipe, galv., buttweld (100 ft)	18.605
Structural Shapes	4.517	Pipe, line (100 ft)	146.804
Bars, tool steel, carbon (lb)	0.430	Casing, oil well, carbon (100 ft)	154.216
Bars, tool steel, alloy, oil hardening die (lb)	0.525	Casing, oil well, alloy (100 ft)	227.875
Bars, tool steel, H.R., alloy, high speed W 6.75, Cr 4.5, V 2.1, Mo 5.5, C 0.080 (lb)	1.115	Tubes, boiler (100 ft)	‡
Bars, tool steel, H.R., alloy, high speed W 18, Cr 4, V 1 (lb)	1.810	Tubing, mechanical, carbon	‡
Bars, H.R., alloy	5.875	Tubing, mechanical, stainless, 304 (100 ft)	161.192
Bars, H.R., stainless, 303 (lb)	0.423	Tin plate, hot-dipped, 1.25 lb	8.533
Bars, H.R., carbon	5.000	Tin plate, electrolytic, 0.25 lb	7.233
Bars, reinforcing	4.963	Black plate, can making quality	6.233
Bars, C.F., carbon	8.160	Wire, drawn, carbon	7.938
Bars, C.F., alloy	11.375	Wire, drawn, stainless, 430 (lb)	0.545
Bars, C.F., stainless, 302 (lb)	0.438	Bale ties (bundle)	5.880
Sheets, H.R., carbon	4.870	Nails, wire, 8d common	7.815
Sheets, C.R., carbon	5.564	Wire, barbed (80-rod spool)	7.097
Sheets, galvanized	7.220	Woven wire fence (20-rod roll)	16.815
Sheets, C.R., stainless, 302 (lb)	0.553		

‡Not available.

STEEL's FINISHED STEEL PRICE INDEX*

	Jan. 19 1955	Week Ago	Month Ago	Year Ago	5 Yrs Ago
Index (1935-39 av.=100)	194.53	194.53	194.53	189.74	156.12
Index in cents per lb	5.270	5.270	5.270	5.140	4.230

STEEL's ARITHMETICAL PRICE COMPOSITES

Finished Steel, NT*	$117.82	$117.82	$117.95	$113.91	$92.86
No. 2 Fdry, Pig Iron, GT	56.54	56.54	56.54	56.54	46.22
Basic Pig Iron, GT	56.04	56.04	56.04	56.04	45.72
Malleable Pig Iron, GT	57.27	57.27	57.27	57.27	47.27
Steelmaking Scrap, GT	35.00	35.00	32.50	29.17	26.83

*For explanation of weighted index see STEEL, Sept. 19, 1949, p. 54; of arithmetical price composite, STEEL, Sept. 1, 1952, p. 130. †Revised.

Comparison of Prices

Comparative prices by districts, in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED STEEL	Jan. 19 1955	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Bars, H.R., Pittsburgh	4.30	4.30	4.30	4.15	3.45
Bars, H.R., Chicago	4.30	4.30	4.30	4.15	3.45
Bars, H.R., deld. Philadelphia	4.55	4.55	4.55	5.302	3.93
Bars, C.F., Pittsburgh	5.40	5.40	5.40	5.20	4.10-4.15
Shapes, Std., Pittsburgh	4.25	4.25	4.25	4.10	3.40
Shapes, Std., Chicago	4.25	4.25	4.25	4.10	3.40
Shapes, deld. Philadelphia	4.53	4.53	4.53	4.38	3.42
Plates, Pittsburgh	4.225	4.225	4.225	4.10	3.50
Plates, Chicago	4.225	4.225	4.225	4.10	3.50
Plates, Coatesville, Pa.	4.225	4.225	4.225	4.35	3.60
Plates, Sparrows Point, Md.	4.225	4.225	4.225	4.10	3.50
Plates, Claymont, Del.	4.225	4.225	4.225	4.05	3.60
Sheets, H.R., Pittsburgh	4.05	4.05	4.05	3.925	3.35
Sheets, H.R., Chicago	4.05	4.05	4.05	3.925	3.35
Sheets, C.R., Pittsburgh	4.95	4.95	4.95	4.775	4.10
Sheets, C.R., Chicago	4.95	4.95	4.95	4.775	4.10
Sheets, C.R., Detroit	5.10	5.10	5.10	4.975	4.30
Sheets, Galv., Pittsburgh	5.45	5.45	5.45	5.275	4.40
Strip, H.R., Pitts.	4.05	4.05	4.05	4.425	3.25
Strip, H.R., Chicago	4.05	4.05	4.05	3.925	3.25
Strip, C.R., Pittsburgh	5.75	5.75	5.75	5.45	4.15
Strip, C.R., Chicago	5.85	5.85	5.85	5.70	4.30
Strip, C.R., Detroit	5.90	5.90	5.90	5.45-6.05	4.35-.40
Wire, Basic, Pitts.	5.75	5.75	5.75	5.525	4.50
Nails, Wire, Pittsburgh	6.85	6.85	6.85	6.55	5.30
Tin plate (1.50 lb), box, Pitts.	$9.05	$9.05	$9.05	$8.95	$7.50
SEMIFINISHED STEEL					
Billets, forging, Pitts. (NT)	$78.00	$78.00	$78.00	$75.50	$63.00
Wire rods, $\frac{7}{32}$-$\frac{9}{32}$" Pitts.	4.675	4.675	4.675	4.525	3.55
PIG IRON, Gross Ton					
Bessemer, Pitts.	$57.00	$57.00	$57.00	$57.00	$47.00
Basic, Valley	56.00	56.00	56.00	56.00	46.00
Basic, deld. Phila.	59.66	59.66	59.66	60.75	49.44
No. 3 Fdry, Pitts.	56.50	56.50	56.50	56.50	46.50
No. 2 Fdry, Chicago	56.50	56.50	56.50	56.50	46.50
No. 2 Fdry, Valley	56.50	56.50	56.50	56.50	46.50
No. 2 Fdry, deld. Phila.	55.16	55.16	55.16	61.25	49.94
No. 2 Fdry, Birm.	52.88	52.88	52.88	52.88	39.38-42.38
No. 2 Fdry (Birm.) deld. Cin.	60.58	60.58	60.58	60.43	46.08
Malleable, Valley	56.50	56.50	56.50	56.50	46.50
Malleable, Chicago	56.50	56.50	56.50	56.50	46.50
Ferromanganese, Duquesne	190.00†	190.00†	190.00†	200.00†	175.00*

*75-82% Mn, gross ton, Etna, Pa. †74-76% Mn, net ton.

SCRAP, Gross Ton (Including broker's commission)

No. 1 Heavy Melt, Pitts.	$36.50	$36.50	$32.50	$30.50	$30.00
No. 1 Heavy Melt, E. Pa.	33.50	33.50	32.00	28.00	23.00
No. 1 Heavy Melt, Chicago	35.00	35.00	33.00	29.00	27.50
No. 1 Heavy Melt, Valley	36.50	36.50	34.50	29.50	30.25
No. 1 Heavy Melt, Cleve.	33.50	33.50	32.50	28.50	27.25
No. 1 Heavy Melt, Buffalo	30.50	30.50	30.50	25.00	27.75
Rails, Rerolling, Chicago	53.00	53.00	52.50	38.00	39.50
No. 1 Cast, Chicago	40.00	40.00	40.00	32.50	38.50
COKE, Net Ton					
Beehive, Furn, Connlsvl.	$13.75	$13.75	$13.75	$14.75	$13.25
Beehive Fdry, Connlsvl.	16.75	16.75	16.75	16.75	13.50
Oven Fdry, Chicago	24.50	24.50	24.50	24.50	20.00

Daily Nonferrous Price Record

	Price Jan. 19	Last Change	Previous Price	Dec. Avg.	Nov. Avg.	Jan. 1954 Avg.
Copper	30.00	Apr. 12, 1954	29.75-30.00	30.000	30.000	29.750
Lead	14.80	Oct. 4, 1954	14.55	14.800	14.800	13.060
Zinc	11.50	Sept. 3, 1954	11.00	11.500	11.500	9.760
Tin	86.25	Jan. 19, 1955	86.875	88.649	91.196	85.100
Nickel	64.50	Nov. 24, 1954	60.00	64.500	60.900	60.000
Aluminum	23.20	Jan. 12, 1955	22.20	22.200	23.200	21.500
Magnesium	27.00	Mar. 9, 1953	24.50	27.000	27.000	27.000

Quotations in cents per pound based on: Copper, deld. Conn. Valley; Lead, common grade, deld. St. Louis; Zinc, prime western, E. St. Louis; Tin, Straits, deld. New York; Nickel, electrolytic cathodes, 99.9%, base size at refinery unpacked; Aluminum, primary ingots, 99+%, deld.; Magnesium 99.8%, Freeport, Tex.

What You Can Use the Markets Section for:

- **A source of price information.**
  Current prices are reported each week. Price changes are shown in italics. Price trends are shown in tables of indexes and comparisons.
- **A directory of producing points.**
  Want to know who makes something, or where it is made? The steel price tables alphabetically list the cities of production and indicate the producing company. If you are a buyer, you may want to make a map showing comparative distances of sources of supply and to help you compute freight costs. If you are a seller of supplies you can make a map to spot your sales possibilities.
- **A source of price data for making your own comparisons.**
  Maybe you want to keep a continuous record of price spread between various forms of steel. You can get your base price information from STEEL's price tables.
- **A source of information on market trends.**
  Newsy items tell you about the supply-demand situation of materials, including iron and steel, nonferrous metals and scrap. Other articles analyze special situations of interest and importance to you.
- **Reports on iron and steel production, and materials and product shipments.**

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NEW SCIAKY DESIGN . . . COMPETITIVELY PRICED

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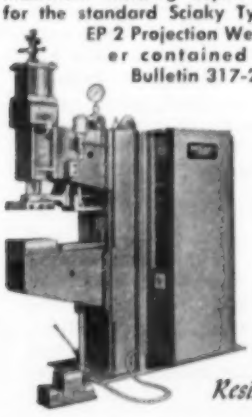

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Nonferrous Metals

Copper industry looks for another 1-million-ton year in 1955. But higher production again poses the old problem: Increasing demand vs. dwindling supply

Nonferrous Metal Prices, Pages 104 & 105

COPPER PRODUCERS are keeping one eye on rising production figures and the other on decreasing ore contents and known U. S. reserves.

While domestic production of copper, like almost everything else, took a dip last year, it looks like the 1955 figure will climb again near the 1-million-ton mark. Copper Institute reports that the production of primary and secondary metal in the U. S.—including Cuban and Philippine output—amounted to 966,484 tons last year. That's a decrease of 101,309 tons from the comparable figure in 1953. Taking the island production out of 1954 figures, production in continental United States was more nearly 825,000 tons. Industry spokesmen have reason to believe continental production will jump to 970,400 tons in 1955.

Here's Why—Copper is one of the most competitive industries in the country, not only within itself but also with other metals. Such competition is leading to an ever-increasing list of new and improved uses of the metal. Air conditioning is a good example. Another is the current "groundswell" for decorative use of copper in the home. For instance, one large midwestern manufacturer of kitchen ranges is making about half of its production with copper trim. Such new uses are helping to push the per capita consumption of the metal to new high levels—in recent years about 18 lb, although it was about 16 lb in 1954. In 1955 it is expected to be about 17 lb. By 1975, the industry may boost the figure to 20 lb.

If the population were to remain stable, it alone would represent a substantial drain on the reserves of this country. But with population in 1975 estimated at between 200 million and 220 million, the combination gives copper men cause to wonder where the metal will come from. There have been no major new discoveries of copper reserves in this country for some years, and none is anticipated in the near future. In addition, copper content is following a steady curve downward. Average content of ore today is 0.85 per cent. Some producers are hauling ore with only one-half of 1 per cent copper content. You can haul topsoil cheaper. In the 1940s, copper content averaged 0.95 per cent; in the 1930s 1.75 per cent.

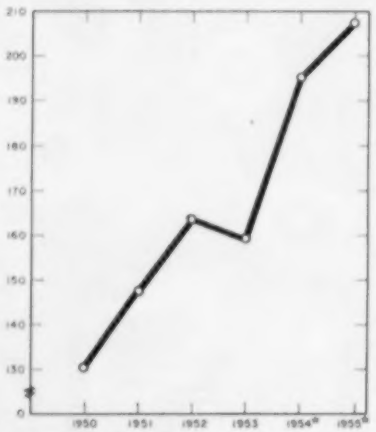
Solutions—There are two primary solutions to the problem facing copper producers. One is greater dependence on foreign reserves, with the inherent problems of tariffs, prices and uncertain world conditions. Last year the U. S. produced only about 39 per cent of the world's copper. In 1953, it was about 42 per cent; in 1950, about 44 per cent. As a nation, our copper consumption runs ahead of our production. Chile is a fairly steady source to make up the deficit, despite threats of deflection to higher-priced European markets. Until some marked progress is made in the internal problems of Rhodesia, that source will be a question mark, although the potential is certainly there. Recent announcements indicate that Israel will begin production of copper soon, although that country's capacity will probably never be more than 15,000 tons a year.

The second solution is substitution of other metals for copper where that is possible. As distasteful as it may be to many copper men, the figures prove that such metals as aluminum are cutting into the copper market to a considerable degree. A study of 15 selected product groups by the Copper Division of Business & Defense Services Administration shows that in 7 of the groups copper usage declined while aluminum gained. In the other eight, though copper gained, aluminum gained even more. A good many copper and brass mills are meeting this challenge by including aluminum in their product mix. One copper man expressed it this way: "Aluminum is not going to push copper out. In the face of decreasing metal, it is going to help copper meet its requirements more easily."

Some Relief—In the meantime, the industry is looking to itself to help the situation. Last week, for example, White Pine Copper Co., a subsidiary of Copper Range Co., poured its first copper from the newly developed White Pine copper mine in upper Michigan. With a potential ore deposit of 309 million tons of 1.1 per cent content, the property is rated at an annual capacity of 37,500 tons of refined copper.

NICKEL PRODUCTION: HEADED FOR NEW RECORDS

(Thousands of net tons)



*Estimated by International Nickel Co. of Canada Ltd.
Source: U.S. Bureau of Mines, Dominion Bureau of Statistics, STEEL

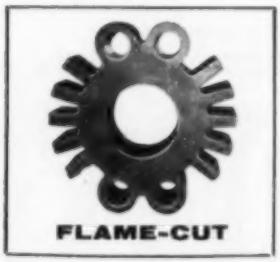
Aluminum Sets New Records

Aluminum racked up new production totals in December and fourth quarter, 1954. December saw the industry turning out 127,056 tons, highest monthly total in history, compared with 121,252 tons in November. The fourth-quarter record total was 373,398 tons. Production last year was 1,460,587 tons against 1,252,015 tons the previous year. Practically all categories of products shared in the increase, with foil showing particular strength.

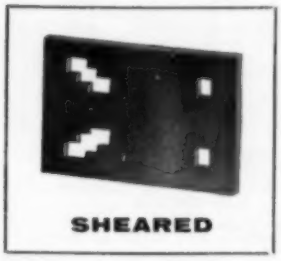
Market Memos

- Even though industry was expecting more nondefense nickel in February than it got in January, rumor has it that the situation will be reversed. However, the long-range picture for 1955 is better. For the year as a whole, there will probably be 10 to 15 per cent more nickel available for nondefense uses than in 1954, which in turn was 10 to 15 per cent better than 1953.

- A $500-million development of bauxite deposits on the Gold Coast over the next seven years is being contemplated, according to C. M. Van Vlierden of the Bank of America. Just returned from a trip to Africa, Mr. Van Vlierden also states that Nigeria is being developed for mineral resources.



FLAME-CUT



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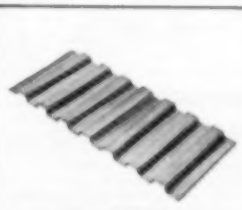

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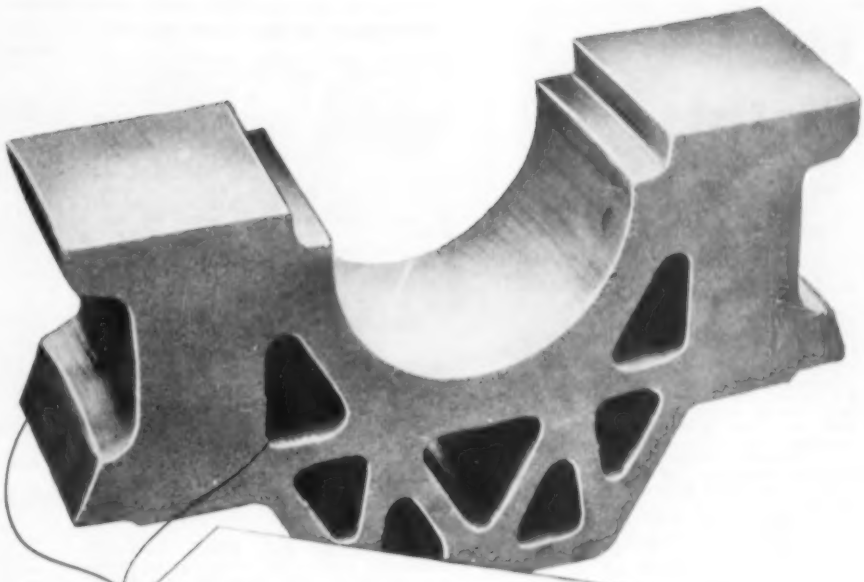

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BY-PRODUCTS STEEL CO.

A Division of Lukens Steel Company

Nonferrous Metals

Cents per pound, carlots, except as otherwise noted

PRIMARY METALS AND ALLOYS

Aluminum: 99 + %, ingots 23.20, pigs 21.50 10,000 lb or more, f.o.b. shipping point. Freight allowed on 500 lb or more.

Aluminum Alloy: No. 13, 12% Si, 25.00; No. 43, 5% Si, 24.8; No. 142, 4% Cu, 1.5% Mg, 2% Ni, 26.2; No. 195, 4.5% Cu, 0.8% Si, 25.5; No. 214, 3.8% Mg, 26.2; No. 356, 7% Si, 0.3% Mg, 24.9.

Antimony: R.M.M. brand, 99.5% 28.50, Lone Star brand, 29.00, f.o.b. Laredo, Tex., in bulk. Foreign brands, 99.5%, 27.00-28.00 New York, duty paid, 10,000 lb or more.

Beryllium: 97%, lump or beads, $71.50 per lb f.o.b. Cleveland or Reading, Pa.

Beryllium Aluminum: 5% Be, $72.75 per lb of contained Be, f.o.b. Reading, Pa.; Elmore, O.

Beryllium Copper: 3.75-4.25% Be, $40.00 per lb of contained Be, with balance as Cu at market price on shipment date, f.o.b. Reading, Pa. or Elmore, O.

Bismuth: $2.25 per lb, ton lots.

Cadmium: Sticks and bars, $1.70 per lb deld.

Cobalt: 97-99%, $2.60 per lb for 550 lb keg; $2.63 per lb for 100 lb case; $2.67 per lb under 100 lb.

Columbium: Powder, $75.00 per lb, nom.

Copper: Electrolytic 30.00 deld. Conn. Valley, 30.00 deld. Midwest; Lake 30.00 deld; Fire refined 29.75 deld.

Germanium: 99.9%, $295 per lb, nom.

Gold: U. S. Treasury, $35 per oz.

Indium: 99.9%, $2.25 per troy oz.

Iridium: $110-$120 nom. per troy oz.

Lead: Common 14.80, chemical 14.90, corroding 14.90, St. Louis; N. Y. basis, add 0.20.

Lithium: 98%, $10-$14 per lb, depending on quantity.

Magnesium: 99.8%, self-palletizing pig 27.00; notched ingot 27.75, 10,000 lb or more, f.o.b. Freeport, Tex. For Port Newark, N. J., and Madison, Ill., add 1.20 for pig and 1.25 for ingot. Sticks 1.3 in. diameter, 46.00, 100 to 4999 lb, f.o.b. Madison, Ill.

Magnesium Alloys: AZ91C and alloys C, H, G and R 32.50; alloy M 34.50, 10,000 lb or more, f.o.b. Freeport, Tex., or Madison, Ill. Add 1.20 for Port Newark, N. J.

Mercury: Open market, spot, New York, $323-$325, per 76-lb flask.

Molybdenum: Powder 99% hydrogen reduced $3.40 per lb; pressed ingot $4.06 per lb; sintered ingot $5.53 per lb.

Nickel: Electrolytic cathodes, sheets (4 x 4 in. and larger), unpacked 64.50; 10-lb pigs, unpacked 67.65; "XX" nickel shot 69.00; "F" nickel shot or ingots for addition to cast iron, 64.50; prices f.o.b. Port Colborne, Ont., including import duty. New York basis, add 0.92.

Osmium: $120-$130 nom. per troy oz.

Palladium: $18-$20 per troy oz.

Platinum: $81-$84 per troy oz from refineries.

Radium: $16-$21.50 per mg radium content, depending on quantity.

Rhodium: $120-$125 per troy oz.

Ruthenium: $50-$55 per troy oz.

Selenium: 99.5%, $6-$7.25 per lb.

Sodium: 16.50, carlots; 17.00 l.c.l.

Tantalum: Sheet, rod $39.00 per lb; powder $33.50 per lb.

Tellurium: $1.75 per lb.

Thallium: $12.50 per lb.

Tin: Straits, N. Y., spot 86.25, prompt 86.25.

Titanium: Sponge, 99.3 + %, grade A-1 ductile (0.3% Fe max) $4.50, grade A-2 (0.8% Fe max) $4 per pound.

Tungsten: Powder, 98.8%, carbon reduced, 1000 lb lots $4.95 per lb nom., f.o.b. shipping point; less than 1000 lb $5.10 nom.; 99 + % hydrogen reduced, $4.65. Treated ingots $6.70.

Zinc: Prime Western 11.50, brass special 11.75, intermediate 12.00, E. St. Louis, freight allowed over 0.50 per pound. High grade 12.85, special high grade 13.00, die casting alloy ingot 15.50, deld.

Zirconium: Sponge $10 per lb; powder electronics grade $15, flash grade $11.50.

(Note: Chromium, manganese and silicon metals are listed in ferroalloy section.)

SECONDARY METALS AND ALLOYS

Aluminum Ingot: Piston alloy 23.50-24.00; No. 12 foundry alloy (No. 2 grade) 23.50; 5% silicon alloy, 0.60 Cu max., 25.00-25.25; 13 alloy 0.60 Cu max., 25.00-25.25; 195 alloy 24.75-25.00; 108 alloy 24.00; steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 24.50-25.00; grade 2, 23.50-24.00; grade 3, 22.75-23.25; grade 4, 22.50.

Brass Ingot: Red brass, No. 115, 30.00; tin bronze No. 225, 41.00; No. 245, 34.75; high-leaded tin bronze, No. 305, 34.00; No. 1 yellow, No. 405, 25.75; manganese bronze No. 421, 27.75.

Magnesium Alloy Ingot: AZ63A, 31.00; AZ91B, 26.00; AZ91C, 31.00; AZ92A, 31.00.

NONFERROUS MILL PRODUCTS

BERYLLIUM COPPER

(Base prices per lb, plus mill extras 2000 to 5000 lb, f.o.b. Temple, Pa.; nominal 1.9% Be alloy) Strip, $1.68; rod, bar, wire, $1.65.

COPPER WIRE

Bare, soft, f.o.b. eastern mills, 100,000 lb lots, 35.36; 30,000 lb lots, 35.48; l.c.l. 35.98. Weatherproof, 100,000 lb, 36.28; 30,000 lb, 36.53; l.c.l. 37.03. Magnet wire deld., 15,000 lb or more 41.83; l.c.l. 42.58.

LEAD

(Prices to jobbers f.o.b. Buffalo, Cleveland, Pittsburgh) Sheets, full rolls, 140 sq ft or more $20.00 per cwt; pipe, full coils $20.00 per cwt; traps and bends, list prices plus 30%.

TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill) Sheets, $15; sheared mill plate, $12; strip, $15; wire, $11; forging billets $9; hot-rolled and forged bars, $9.

ZINC

(Prices per lb c.l., f.o.b. mill) Sheets 23.00; ribbon zinc in coils, 18.50-20.50; plates 18.00-22.25.

ZIRCONIUM

Plate $27; H.R. strip $28; C.R. strip $35; forged or H.R. bars $27; wire, 0.015 in., 1 cent per linear foot.

NICKEL, MONEL, INCONEL

	"A" Nickel	Monel	Inconel
Sheet, C.R.	102	78	99
Strip, C.R.	102	87	125
Plate, H.R.	97	82	95
Rod, Shapes H.R.	87	69	93
Rod, Shapes C.R.	91	75	115
Seamless Tubes	122	108	153
Shot, Blocks	...	65	...

ALUMINUM

Screw Machine Stock: 5000 lb and over.

Dia. (in.) or across flats	Round 2011-T3	Round 2017-T4	Hexagonal 2011-T3	Hexagonal 2017-T4
Drawn				
0.125	63.5	62.0	...	...
0.156-0.172	53.9	52.3	...	...
0.188	53.9	52.3	...	66.8
0.219-0.234	51.1	49.5	...	...
0.250-0.281	51.1	49.5	...	63.7
0.313	51.1	49.5	...	60.8
Cold-finished				
0.375-0.547	49.9	47.5	59.8	57.2
0.563-0.688	49.9	47.5	56.9	53.7
0.750-1.000	48.7	46.3	52.1	50.6
1.063	48.7	46.3	...	48.9
1.125-1.500	46.9	44.6	50.4	48.9
Rolled				
1.563	45.7	43.4	...	...
1.625-2.000	45.1	42.8	...	47.2
2.125-2.500	44.0	41.7	...	...
2.563-3.375	42.7	40.5	...	...

ALUMINUM

Sheets and Circles: 1100 and 3003 mill finish c.l. (30,000 lb base; freight allowed over 499 lb)

Thickness Range Inches	Widths or Diameters, In., Inc.	Flat Sheet*	Coiled Sheet	Coiled Sheet Circle†
0.249-0.136	12-49	35.9	...	...
0.135-0.096	12-48	36.4	...	...
0.095-0.077	12-48	37.1	34.6	39.6
0.076-0.061	12-48	37.7	34.8	39.8
0.060-0.048	12-48	38.2	35.1	40.2
0.047-0.038	12-48	38.7	35.6	40.6
0.037-0.030	12-48	39.1	36.0	41.3
0.029-0.024	12-48	39.7	36.3	41.8
0.023-0.019	12-36	40.4	37.1	42.6
0.018-0.017	12-36	41.2	37.7	43.3
0.016-0.015	12-36	42.1	38.5	44.7
0.014	12-24	43.1	39.5	46.0
0.013-0.012	12-24	44.3	40.2	47.0
0.011	12-24	45.3	41.4	48.8
0.010-0.0095	12-24	46.5	42.5	50.2
0.009-0.0085	12-24	47.8	44.0	52.3
0.008-0.0075	12-24	49.4	45.2	54.1
0.007	12-18	50.9	46.7	56.4
0.006	12-18	52.5	48.1	61.4

*72-180 in. lengths. †36 in. max. dia.

ALUMINUM

Plates and Circles: Thickness 0.250-3.0 in 24-60 in. width or dia, 72-240 in. lengths.

Alloy	Plate Base	Circle Base
1100-F, 3003-F	35.7	39.9
5050-F	35.7	39.9
3004-F	36.7	41.6
5052-F	38.4	43.4
6061-T6	39.6	44.0
2024-T4*	41.8	47.9
7075-T6*	49.6	56.2

*24-48 in. widths or dia., 72-180 in. lengths

ALUMINUM

Forging Stock: Round, Class 1, 47.8-37.3 in specific lengths 36-144 in., diameters 0.375-8 in. Rectangles and squares, Class 1, 53.6-41 in random lengths 0.375-4.0 in. thick, widths 0.750-10 in.

Pipe: A.S.A. Schedule 40, alloy 6063-T6, 20 ft length, plain ends, 90,000 lb base, per 100 ft

Nom. pipe size in.		Nom. pipe Size, in.	
¼	$16.10	2	$ 49.55
1	23.35	4	136.85
1¼	34.30	6	244.90
1½	41.00	8	368.50

MAGNESIUM

Sheet: AZ31, commercial grade, 0.032-in. 94.00, 0.064-in. 73.00, 0.125-in. 60.00, 30,000 lb and over, f.o.b. mill.

Plate: Hot rolled AZ31, 53.00, 20,000 lb or more 0.250-in. and over widths to 48 in., lengths to 144 in.; raised pattern floor plate, 59.00, 20,000 lb or more, ¼-in. thick, widths 24-72 in., lengths 60-192 in.

Extrusion Stock: AZ31, Rectangles, ¼ x 2 in. 69.20, 1 x 4 in. 63.00. Rod, 1 in. 66.05, 2 in. 62.50. Tubing, 1 in. OD x 0.065-in. 87.00. Angles, 1 x 1 x ⅛-in. 72.90, 2 x 2 x ¼-in. 67.00. Channels, 5 in. 67.80. I-Beams, 5 in. 66.20.

NONFERROUS SCRAP

DEALERS' BUYING PRICES

(Cents per pound, New York, in ton lots)

Aluminum: 1100 clippings 15.00-15.50; old sheet 11.00-12.00; borings and turnings 7.50-8.50; pistons and struts 8.50-9.50; crankcases 11.00-12.00; industrial castings 11.00.

BRASS MILL PRICES

	MILL PRODUCTS a				SCRAP ALLOWANCES f		
	Sheet, Strip, Plate	Rod	Wire	Seamless Tube	Clean Heavy	Rod Ends	Clean Turnings
Copper	48.76b	46.36c	....	48.82	26.000	26.000	25.250
Yellow Brass	42.27	42.21d	42.81	45.18	19.875	19.625	18.250
Red Brass, 85%	45.89	45.83	46.43	48.70	23.000	22.750	22.250
Low Brass, 80%	44.95	44.89	45.49	47.76	22.250	22.000	21.500
Naval Brass	46.39	40.70	50.43	49.55	18.500	18.250	17.750
Commercial Bronze, 90%	47.38	47.32	47.92	49.94	23.875	23.625	23.125
Nickel Silver, 10%	56.30	60.68g	58.63	....	24.25	24.00	12.125
Phosphor Bronze, A, 5%	67.31	67.81	67.81	68.96	26.500	26.250	25.250
Silicon Bronze	53.09	52.98	53.13	70.49e	25.125	24.875	24.125
Manganese Bronze	50.09	44.25	54.70	....	18.500	18.250	17.750
Munts Metal	44.54	40.35	....	....	18.750	18.500	18.000

a. Cents per lb f.o.b. mill; freight allowed on 500 lb or more. b. Hot-rolled. c. Cold-drawn. d. Free cutting. e. 3% silicon. f. Prices in cents per lb for less than 20,000 pounds, f.o.b. shipping point. On lots over 20,000 lb at one time, of any or all kinds of scrap, add 1 cent per lb. g. Leaded.

Copper and Brass: Heavy copper and wire No. 1 26.00-27.50; No. 2 copper 25.00-26.00; light copper 23.00-24.00; No. 1 composition red brass 21.00-21.50; No. 1 composition turnings 20.00-21.00; mixed brass turnings 13.50-14.50; new brass clippings 17.50-19.00; No. 1 brass rod turnings 14.50-16.00; light brass 12.50-13.00; heavy yellow brass 16.00-16.50; new brass rod ends 16.00-17.00; auto radiators, unsweated 17.00-17.50; cocks and faucets 17.50-18.00; brass pipe 17.50-18.00

Lead: Heavy 11.50-11.75; battery plate 6.00-6.50; linotype and stereotype 13.50-14.25; electrotype 12.00-12.50; mixed babbitt 12.00-12.50.

Magnesium: Clippings 18.50-19.50; clean castings 17.50-18.50; iron castings, not over 10% removable Fe, 15.50-16.50.

Monel: Clippings 26.00; old sheet 26.00; turnings 21; rods 28.00.

Nickel: Sheets and clips 50.00-57.00; rolled anodes 50.00-57.00; turnings 30.00-40.00; rod ends 50.00-57.00.

Tin: No. 1 pewter 50.00-55.00; block tin pipe 70.00-75.00; No. 1 babbitt 45.00.

Zinc: Old zinc, 4.75-5.50; new die cast scrap, 4.75-5.00; old die cast scrap, 3.25-3.50.

REFINERS' BUYING PRICES

(Cents per pound, carlots, delivered refinery)

Aluminum: 1100 clippings 17.25-17.75; 3003 clippings 17.25-17.75; 6151 clippings 17.25-17.75; 5052 clippings 17.25-17.75; 2014 clippings 16.50-17.00; 2017 clippings 16.50-17.00; 2024 clippings 16.50-17.00; mixed clippings 16.50-17.00; old sheet 15.50-16.00; old cast 15.50-16.00; clean old cable (free of steel) 17.25-17.75; borings and turnings 15.50-16.50.

Beryllium Copper: Heavy scrap, 0.020-in. and heavier, not less than 1.5% Be, 42.00; light scrap 37.00.

Copper, Brass: No. 1 copper 29.50; No. 2 copper 28.00; light copper 26.50; refinery brass (60% copper) per dry copper content 24.00.

INGOTMAKERS' BUYING PRICES

(Cents per pound, carlots, delivered)

Copper, Brass: No. 1 copper 28.50-29.00; No. 2 copper 27.00-27.50; light copper 25.50-26.00; No. 1 composition borings 23.50-24.00; No. 1 composition solids 23.75-24.25; heavy yellow brass solids 18.50-19.00; yellow brass turnings 17.50-18.00; radiators 19.50-20.00.

PLATING MATERIALS

(F.o.b. shipping point, freight allowed on quantities)

ANODES

Cadmium: Special or patented shapes $1.70 per lb.

Copper: Flat-rolled 45.04, oval 44.54, 5000-10,000 lb; electrodeposited 39.78, cast 42.04, 2000-5000 lb lots.

Nickel: Depolarized, less than 500 lb 92.00; 500-4999 lb 88.00; over 5000 lb 86.00.

Tin: Bar or slab, less than 200 lb $1.055; 200-499 lb $1.04; 500-999 lb $1.035; 1000 lb or more $1.03.

Zinc: Bar 20.00, bar or flat top 19.00 ton lots.

CHEMICALS

Cadmium Oxide: $2.15 per lb, in 100 lb drums.

Chromic Acid: Less than 10,000 lb 28.50; over 10,000 lb 27.50.

Copper Cyanide: Under 1000 lb 63.90; 1000 lb and over 61.90.

Copper Sulphate: 100-6000 lb 11.35; 6000-12,000 lb 11.15; 12,000-24,000 lb 10.85; 24,000-36,000 lb 10.60; 36,000 lb and over 10.35.

Nickel Chloride: 100 lb 45.00; 200 lb 43.00; 300 lb 42.00; 400-4900 lb 40.00; 5000-9900 lb 38.00; 10,000 lb and over 37.00.

Nickel Sulphate: 100 lb 37.00; 200 lb 35.00; 300 lb 34.00; 400-4900 lb 32.00; 5000-35,000 lb 30.00; 36,000 lb and over 29.00.

Silver Cyanide: Cents per ounce, 16 oz 80.625; 100 oz 78.50; 25,000 oz and over 77.325.

Sodium Cyanide: Egg, under 1000 lb 19.80; 1000-19,900 lb 18.80; 20,000 lb and over 17.80; granular, add 1-cent premium to above.

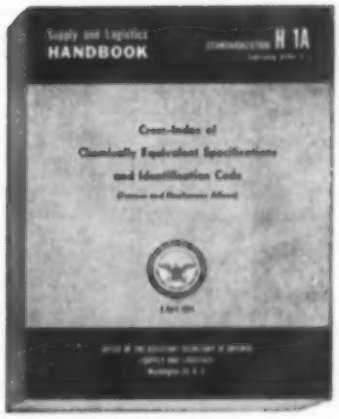
Sodium Stannate: Less than 100 lb 65.2; 100-600 lb 54.1; 700-1900 lb 51.6; 2000-9900 lb 49.8; 10,000 lb or more 48.7.

Stannous Chloride (Anhydrous): Less than 50 lb $1.533; 50 lb $1.193; 100-300 lb $1.043; 400-900 lb $1.019; 1000-1900 lb 99.4; 2000-4900 lb 95.8; 5000-19,000 lb 89.7; 20,000 lb and over 83.6

Stannous Sulphate: Less than 5 lb $1.235; 50 lb 93.5; 100-1900 lb 91.5; 2000 lb and over 89.5.

Zinc Cyanide: Under 1000 lb 54.30; 1000 lb and over 52.30.

More Help With Metal Specs



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You can get it from the new revised cross-index of chemically equivalent specifications for steel and nonferrous alloys, just published by Department of Defense.

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Scope—Listed and cross-indexed are specifications of Army, Air Force, Navy, AISI, Dept. of Defense (MIL and JAN), ASTM, SAE, Aeronautical Standard Group, General Services Administration (Federal), Aeronautical Material (SAE) and Aluminum producers.

Metals included are iron and steel, copper, nickel, cobalt, titanium, lead, tin, silver, aluminum, magnesium, zinc, bismuth, cadmium, antimony, gold, platinum and their alloys.

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(Please print or type)

Steel Prices

Mill prices as reported to STEEL, cents per pound except as otherwise noted. Changes shown in italics. Code numbers following mill points indicate producing company; Key on page 107. Key to footnotes, page 109.

SEMIFINISHED

INGOTS, Carbon, Forging (NT)

Munhall,Pa. U5 ..... $61.50

INGOTS, Alloy (NT)

Detroit R7 ..... $65.00
Houston 85 ..... 70.00
Midland,Pa. C18 ..... 65.00
Munhall,Pa. U5 ..... 65.00

BILLETS, BLOOMS & SLABS
Carbon, Rerolling (NT)

Aliquippa,Pa. J5 ..... $64.00
Bessemer,Pa. U5 ..... 64.00
Buffalo R2 ..... 64.00
Clairton,Pa. U5 ..... 64.00
Ensley,Ala. T2 ..... 64.00
Fairfield,Ala. T2 ..... 64.00
Fontana,Calif. K1 ..... 72.00
Gary,Ind. U5 ..... 64.00
Johnstown,Pa. B2 ..... 64.00
Lackawanna,N.Y. B2 ..... 64.00
Munhall,Pa. U5 ..... 64.00
Pittsburgh J5 ..... 64.00
So.Chicago,Ill. R2, U5 ..... 64.00
So.Duquesne,Pa. U5 ..... 64.00
Youngstown R2 ..... 64.00

Carbon, Forging (NT)

Aliquippa,Pa. J5 ..... $78.00
Bessemer,Pa. U5 ..... 78.00
Buffalo R2 ..... 78.00
Canton,O. R2 ..... 80.00
Clairton,Pa. U5 ..... 78.00
Conshohocken,Pa. A3 ..... 83.00
Ensley,Ala. T2 ..... 78.00
Fairfield,Ala. T2 ..... 78.00
Fontana,Calif. K1 ..... 86.00
Gary,Ind. U5 ..... 78.00
Geneva,Utah C11 ..... 78.00
Houston 85 ..... 83.00
Johnstown,Pa. B2 ..... 78.00
Lackawanna,N.Y. B2 ..... 78.00
LosAngeles B3 ..... 87.50
Midland,Pa. C18 ..... 78.00
Munhall,Pa. U5 ..... 78.00
Pittsburgh J5 ..... 78.00
Seattle B3 ..... 91.50
So.Chicago R2,U5,W14 ..... 78.00
So.Duquesne,Pa. U5 ..... 78.00
So.SanFrancisco B3 ..... 87.50

Alloy, Forging (NT)

Bethlehem,Pa. B2 ..... $86.00
Buffalo R2 ..... 86.00
Canton,O. R2, T7 ..... 86.00
Conshohocken,Pa. A3 ..... 93.00
Detroit R7 ..... 86.00
Fontana,Calif. K1 ..... 105.00
Gary,Ind. U5 ..... 86.00
Houston 85 ..... 91.00
Ind.Harbor,Ind. Y1 ..... 86.00
Johnstown,Pa. B2 ..... 86.00
Lackawanna,N.Y. B2 ..... 86.00
LosAngeles B3 ..... 100.00
Massillon,O. R2 ..... 86.00
Midland,Pa. C18 ..... 86.00
Munhall,Pa. U5 ..... 86.00
So.Chicago R2,U5,W14 ..... 86.00
So.Duquesne,Pa. U5 ..... 86.00
Struthers,O. Y1 ..... 86.00
Warren,O. C17 ..... 86.00

ROUNDS, SEAMLESS TUBE (NT)

Buffalo R2 ..... $96.50
Canton,O. R2 ..... 96.50
Cleveland R2 ..... 96.50
Gary,Ind. U5 ..... 96.50
So.Chicago R2, W14 ..... 96.50
So.Duquesne,Pa. U5 ..... 96.50

SKELP

Aliquippa,Pa. J5 ..... 4.00
Fontana,Calif. K1 ..... 4.775
Munhall,Pa. U5 ..... 3.90
SparrowsPoint,Md. B2 ..... 3.90
Warren,O. R2 ..... 3.90
Youngstown R2, U5 ..... 3.90

WIRE RODS

AlabamaCity,Ala. R2 ..... 4.675
Aliquippa,Pa. J5 ..... 4.675
Alton,Ill. L1 ..... 4.85
Buffalo B11, W12 ..... 4.675
Cleveland A7 ..... 4.675
Donora,Pa. A7 ..... 4.675
Fairfield,Ala. T2 ..... 4.675
Fontana,Calif. K1 ..... 5.475
Houston 85 ..... 4.925
IndianaHarbor,Ind. Y1 ..... 4.675
Johnstown,Pa. B2 ..... 4.675
Joliet,Ill. A7 ..... 4.675
KansasCity,Mo. 85 ..... 4.925
Kokomo,Ind. C16 ..... 4.775
LosAngeles B3 ..... 5.475
Minnequa,Colo. C10 ..... 4.925
Monessen,Pa. P7 ..... 4.675
No.Tonawanda,N.Y. B11 ..... 4.675
Pittsburg,Calif. C11 ..... 5.325
Portsmouth P12 ..... 4.675
Roebling,N.J. R5 ..... 4.775
So.Chicago,Ill. R2 ..... 4.675
SparrowsPoint,Md. B2 ..... 4.775
Sterling,Ill.(1) N15 ..... 4.675
Sterling,Ill. N15 ..... 4.775
Struthers,O. Y1 ..... 4.675
Torrance,Calif. C11 ..... 5.475
Worcester,Mass. A7 ..... 4.975

STRUCTURALS

Carbon Steel Stand. Shapes

Ala.City,Ala. R2 ..... 4.25
Aliquippa,Pa. J5 ..... 4.25
Bessemer,Ala. T2 ..... 4.25
Bethlehem,Pa. B2 ..... 4.30
Birmingham C15 ..... 4.25
Clairton,Pa. U5 ..... 4.25
Fairfield,Ala. T2 ..... 4.25
Fontana,Calif. K1 ..... 4.90
Gary,Ind. U5 ..... 4.25
Geneva,Utah C11 ..... 4.25
Houston 85 ..... 4.30
Ind.Harbor,Ind. I-2 ..... 4.25
Johnstown,Pa. B2 ..... 4.30
KansasCity,Mo. 85 ..... 4.30
Lackawanna,N.Y. B2 ..... 4.30
LosAngeles B3 ..... 4.95
Minnequa,Colo. C10 ..... 4.70
Munhall,Pa. U5 ..... 4.25
Niles,Calif. P1 ..... 4.90
Phoenixville,Pa. P4 ..... 3.95
Portland,Oreg. O4 ..... 5.00
Seattle B3 ..... 5.00
So.Chicago U5, W14 ..... 4.25
So.SanFrancisco B3 ..... 4.90
Torrance,Calif. C11 ..... 4.95
Weirton,W.Va. W6 ..... 4.25

Wide Flange

Bethlehem,Pa. B2 ..... 4.30
Clairton,Pa. U5 ..... 4.25
Fontana,Calif. K1 ..... 5.25
Lackawanna,N.Y. B2 ..... 4.30
Munhall,Pa. U5 ..... 4.25
Phoenixville,Pa. P4 ..... 3.95
So.Chicago,Ill. U5 ..... 4.25

Alloy Stand. Shapes

Clairton,Pa. U5 ..... 5.20
Fontana,Calif. K1 ..... 6.60
Gary,Ind. U5 ..... 5.20
Houston 85 ..... 5.45
Munhall,Pa. U5 ..... 5.20
So.Chicago,Ill. U5 ..... 5.20

H.S., L.A. Stand. Shapes

Aliquippa,Pa. J5 ..... 6.40
Bessemer,Ala. T2 ..... 6.40
Bethlehem,Pa. B2 ..... 6.45
Clairton,Pa. U5 ..... 6.40
Fairfield,Ala. T2 ..... 6.40
Fontana,Calif. K1 ..... 7.05
Gary,Ind. U5 ..... 6.40
Geneva,Utah C11 ..... 6.40
Houston 85 ..... 6.45
Ind.Harbor,Ind. I-2, Y1 ..... 6.40
Johnstown,Pa. B2 ..... 6.45
KansasCity,Mo. 85 ..... 6.45
Lackawanna,N.Y. B2 ..... 6.45
LosAngeles B3 ..... 7.10
Munhall,Pa. U5 ..... 6.40
Seattle B3 ..... 7.15
So.Chicago,Ill. U5, W14 ..... 6.40
So.SanFrancisco B3 ..... 7.05
Struthers,O. Y1 ..... 6.40

H.S., L.A. Wide Flange

Bethlehem,Pa. B2 ..... 6.45
Lackawanna,N.Y. B2 ..... 6.45
Munhall,Pa. U5 ..... 6.40
So.Chicago,Ill. U5 ..... 6.40

PILING

BEARING PILES

Munhall,Pa. U5 ..... 4.25
So.Chicago,Ill. U5 ..... 4.25

STEEL SHEET PILING

Ind.Harbor,Ind. I-2 ..... 5.075
Lackawanna,N.Y. B2 ..... 5.075
Munhall,Pa. U5 ..... 5.075
So.Chicago,Ill. U5 ..... 5.075

PLATES

PLATES, Carbon Steel

Ala.City,Ala. R2 ..... 4.225
Aliquippa,Pa. J5 ..... 4.225
Ashland,Ky.(15) A10 ..... 4.225
Bessemer,Ala. T2 ..... 4.225
Buffalo R2 ..... 4.225
Clairton,Pa. U5 ..... 4.225
Claymont,Del. C22 ..... 4.225
Cleveland J5, R2 ..... 4.225
Coatesville,Pa. L7 ..... 4.225
Conshohocken,Pa. A3 ..... 4.225
Ecorse,Mich. G5 ..... 4.325
Fairfield,Ala. T2 ..... 4.225
Fontana,Calif.(30) K1 ..... 4.875
Gary,Ind. U5 ..... 4.226
Geneva,Utah C11 ..... 4.225
GraniteCity,Ill. G4 ..... 4.425
Harrisburg,Pa. C5 ..... 3.975
Houston 85 ..... 4.275
Ind.Harbor,Ind. I-2, Y1 ..... 4.225
Johnstown,Pa. B2 ..... 4.225
Lackawanna,N.Y. B2 ..... 4.225
LoneStar,Tex. L6 ..... 4.55
Mansfield,O. E6 ..... 4.225
Minnequa,Colo. C10 ..... 5.075
Munhall,Pa. U5 ..... 4.225
Newport,Ky. N9 ..... 4.225
Pittsburgh J5 ..... 4.225
Riverdale Ill. A1 ..... 4.225
Seattle B3 ..... 5.125
Sharon,Pa. S3 ..... 4.225
So.Chicago,Ill. R2 ..... 4.225
So.Chicago,Ill. U5,W14 ..... 4.225
SparrowsPoint,Md. B2 ..... 4.225
Steubenville,O. W10 ..... 4.225
Warren,O. R2 ..... 4.225
Weirton,W.Va. W6 ..... 4.225
Youngstown R2,U5,Y1 ..... 4.225

PLATES, Carbon Abras. Resist.

Fontana,Calif. K1 ..... 6.025
Geneva,Utah C11 ..... 5.275

PLATES, Wrought Iron

Economy,Pa. B14 ..... 9.80

PLATES, High-Strength Low-Alloy

Aliquippa,Pa. J5 ..... 6.45
Bessemer,Ala. T2 ..... 6.45
Clairton,Pa. U5 ..... 6.45
Cleveland J5, R2 ..... 6.45
Conshohocken,Pa. A3 ..... 6.45
Ecorse,Mich. G5 ..... 6.55
Fairfield,Ala. T2 ..... 6.45
Fontana,Calif.(30) K1 ..... 7.15
Gary,Ind. U5 ..... 6.45
Geneva,Utah C11 ..... 6.45
Houston 85 ..... 6.50
Ind.Harbor,Ind. I-2, Y1 ..... 6.45
Johnstown,Pa. B2 ..... 6.45
Lackawanna,N.Y. B2 ..... 6.45
LosAngeles B3 ..... 7.35
Munhall,Pa. U5 ..... 6.45
Pittsburgh J5 ..... 6.45
Seattle B3 ..... 7.35
Sharon,Pa. S3 ..... 6.45
So.Chicago,Ill. U5, W14 ..... 6.45
SparrowsPoint,Md. B2 ..... 6.45
Youngstown U5, Y1 ..... 6.45

PLATES, Alloy

Claymont,Del. C22 ..... 5.80
Coatesville,Pa. L7 ..... 5.80
Fontana,Calif. K1 ..... 6.46
Gary,Ind. U5 ..... 5.80
Houston 85 ..... 5.85
Ind.Harbor,Ind. Y1 ..... 5.80
Johnstown,Pa. B2 ..... 5.80
Munhall,Pa. U5 ..... 5.80
Newport,Ky. N9 ..... 5.80
Seattle B3 ..... 6.70
Sharon,Pa. S3 ..... 5.80
So.Chicago,Ill. U5, W14 ..... 5.80
SparrowsPoint,Md. B2 ..... 5.80
Youngstown Y1 ..... 5.80

FLOOR PLATES

Cleveland J5 ..... 5.275
Conshohocken,Pa. A3 ..... 5.275
Harrisburg,Pa. C5 ..... 5.15
Ind.Harbor,Ind. I-2 ..... 5.275
Munhall,Pa. U5 ..... 5.275
So.Chicago,Ill. U5 ..... 5.275

PLATES, Ingot Iron

Ashland c.l. (15) A10 ..... 4.475
Ashland l.c.l. (15) A10 ..... 4.975
Cleveland c.l. R2 ..... 4.825
Warren,O. c.l. R2 ..... 4.825

BARS

BARS, Hot-Rolled Carbon

Ala.City,Ala. R2 ..... 4.30
Aliquippa,Pa. J5 ..... 4.30
Alton,Ill. L1 ..... 4.50
Atlanta,Ga. A11 ..... 4.50
Bessemer,Ala. T2 ..... 4.30
Birmingham C15 ..... 4.30
Buffalo R2 ..... 4.30
Canton,O. R2 ..... 4.40
Clairton,Pa. U5 ..... 4.30
Cleveland R2 ..... 4.30
Ecorse,Mich. G5 ..... 4.40
Emeryville,Calif. J7 ..... 5.05
Fairfield,Ala. T2 ..... 4.30
Fairless,Pa. U5 ..... 4.45
Fontana,Calif. K1 ..... 5.00
Gary,Ind. U5 ..... 4.30
Houston 85 ..... 4.55
Ind.Harbor,Ind. I-2, Y1 ..... 4.30
Johnstown,Pa. B2 ..... 4.30
KansasCity,Mo. 85 ..... 4.55
Lackawanna,N.Y. B2 ..... 4.30
LosAngeles B3 ..... 5.00
Massillon,O. R2 ..... 4.40
Midland,Pa. C18 ..... 4.30
Milton,Pa. M18 ..... 4.30
Minnequa,Colo. C10 ..... 4.75
Niles,Calif. P1 ..... 5.00
N.Tonawanda,N.Y. B11 ..... 4.30
Pittsburg,Calif. C11 ..... 5.00
Pittsburgh J5 ..... 4.30
Portland,Oreg. O4 ..... 5.05
Seattle B3, N14, P23 ..... 6.05
So.Chicago, R2,U5,W14 ..... 4.30
So.Duquesne,Pa. U5 ..... 4.30
So.SanFran.,Calif. B3 ..... 5.05
Sterling,Ill.(1) N15 ..... 4.30
Sterling,Ill. N15 ..... 4.40
Struthers,O. Y1 ..... 4.30
Torrance,Calif. C11 ..... 5.00
Warren,O. R2 ..... 4.30
Weirton,W.Va. W6 ..... 4.30
Youngstown R2, U5 ..... 4.30

BARS, Hot-Rolled Alloy

Bethlehem,Pa. B2 ..... 5.075
Buffalo R2 ..... 5.075
Canton,O. R2, T7 ..... 5.075
Clairton,Pa. U5 ..... 5.075
Detroit R7 ..... 5.075
Ecorse,Mich. G5 ..... 5.175
Fontana,Calif. K1 ..... 6.125
Fairless,Pa. U5 ..... 5.225
Gary,Ind. U5 ..... 5.075
Houston 85 ..... 5.325
Ind.Harbor,Ind. I-2, Y1 ..... 5.075
Johnstown,Pa. B2 ..... 5.075
KansasCity,Mo. 85 ..... 5.325
Lackawanna,N.Y. B2 ..... 5.075
LosAngeles B3 ..... 6.125
Massillon,O. R2 ..... 5.075
Midland,Pa. C18 ..... 5.075
So.Chicago R2, U5, W14 ..... 5.075
So.Duquesne,Pa. U5 ..... 5.075
Struthers,O. Y1 ..... 5.075
Warren,O. C17 ..... 5.075
Youngstown U5 ..... 5.075

BARS, H.R. Leaded Alloy

Warren,O. C17 ..... 5.825

BARS & SMALL SHAPES, H.R. High-Strength Low-Alloy

Aliquippa,Pa. J5 ..... 6.45
Bessemer,Ala. T2 ..... 6.45
Bethlehem,Pa. B2 ..... 6.45
Clairton,Pa. U5 ..... 6.45
Cleveland R2 ..... 6.45
Ecorse,Mich. G5 ..... 6.55
Fairfield,Ala. T2 ..... 6.45
Fontana,Calif. K1 ..... 7.70
Gary,Ind. U5 ..... 6.45
Houston 85 ..... 6.70
Ind.Harb.,Ind. I-2, Y1 ..... 6.45
Johnstown,Pa. B2 ..... 6.45
KansasCity,Mo. 85 ..... 6.70
Lackawanna,N.Y. B2 ..... 6.45
LosAngeles B3 ..... 7.15
Pittsburgh J5 ..... 6.45
Seattle B3 ..... 7.20
So.Chicago W14 ..... 6.45
So.Duquesne,Pa. U5 ..... 6.45
So.SanFrancisco B3 ..... 7.20
Struthers,O. Y1 ..... 6.45
Warren,O. R2 ..... 6.45
Youngstown U5 ..... 6.45

BAR SIZE ANGLES; H.R. Carbon

Bethlehem,Pa. B2 ..... 4.43

BAR SIZE ANGLES; S. Shapes

Aliquippa,Pa. J5 ..... 4.30
Atlanta A11 ..... 4.50
Fontana,Calif. K1 ..... 5.00
Niles,Calif. P1 ..... 5.00
Pittsburgh J5 ..... 4.30
Portland,Oreg. O4 ..... 5.05
SanFrancisco S7 ..... 4.70

BAR SHAPES, Hot-Rolled Alloy

Clairton,Pa. U5 ..... 5.20
Gary,Ind. U5 ..... 5.20
Houston 85 ..... 5.45
KansasCity 85 ..... 5.45
Youngstown U5 ..... 5.20

BARS, Cold-Finished Carbon

Ambridge,Pa. W18 ..... 5.40
BeaverFalls,Pa. M12, R2 ..... 5.40
Buffalo B5 ..... 5.45
Camden,N.J. P13 ..... 5.85
Carnegie,Pa. C12 ..... 5.40
Chicago W18 ..... 5.40
Cleveland A7, C20 ..... 5.40
Detroit R7 ..... 5.40
Detroit B5, P17 ..... 5.60
Donora,Pa. A7 ..... 5.40
Elyria,O. W8 ..... 5.40
FranklinPark,Ill. N5 ..... 5.40
Gary,Ind. R2 ..... 5.40
GreenBay,Wis. F7 ..... 5.40
Hammond,Ind. L2, M13 ..... 5.40
Hartford,Conn. R2 ..... 5.90
Harvey,Ill. B5 ..... 5.40
LosAngeles R2, S30 ..... 6.85
Mansfield,Mass. B5 ..... 5.95
Massillon,O. R2, R8 ..... 5.40
Midland,Pa. C18 ..... 5.40
Monaca,Pa. S17 ..... 5.40
Newark,N.J. W18 ..... 5.85
NewCastle,Pa.(17) B4 ..... 5.40
Pittsburgh J5 ..... 5.40
Plymouth,Mich. P5 ..... 5.65
Putnam,Conn. W18 ..... 5.95
Readville,Mass. C14 ..... 5.95
So.Chicago,Ill. W14 ..... 5.40
SpringCity,Pa. K3 ..... 5.85
Struthers,O. Y1 ..... 5.40
Waukegan,Ill. A7 ..... 5.40
Worcester,Mass. W19 ..... 5.85
Youngstown F3, Y1 ..... 5.40

BARS, Cold-Finished Carbon (Turned and Ground)

Cumberland,Md.(5) C19 ..... 4.65

BARS, Cold-Finished Alloy

Ambridge,Pa. W18 ..... 6.625
BeaverFalls,Pa. M12,R2 ..... 6.625
Bethlehem,Pa. B2 ..... 6.625
Buffalo B5 ..... 6.625
Camden,N.J. P13 ..... 6.80
Canton,O. T7 ..... 6.625
Carnegie,Pa. C12 ..... 6.625
Chicago W18 ..... 6.625
Cleveland A7, C20 ..... 6.625
Detroit R7 ..... 6.625
Detroit B5, P17 ..... 6.825
Donora,Pa. A7 ..... 6.625
Elyria,O. W8 ..... 6.625
Gary,Ind. R2 ..... 6.625
GreenBay,Wis. F7 ..... 6.625
Hammond,Ind. L2, M13 ..... 6.625
Hartford,Conn. R2 ..... 6.925
Harvey,Ill. B5 ..... 6.625
Lackawanna,N.Y. B2 ..... 6.625
LosAngeles S30 ..... 8.30
Mansfield,Mass. B5 ..... 6.925
Massillon,O. R2, R8 ..... 6.625
Midland,Pa. C18 ..... 6.625
Monaca,Pa. S17 ..... 6.625
Newark,N.J. W18 ..... 6.80
Plymouth,Mich. P5 ..... 6.825
So.Chicago W14 ..... 6.625
SpringCity,Pa. K3 ..... 6.80
Struthers,O. Y1 ..... 6.625
Warren,O. C17 ..... 6.625
Waukegan,Ill. A7 ..... 6.625
Worcester,Mass. A7 ..... 6.925
Youngstown F3, Y1 ..... 6.625

BARS, C.F. Leaded Alloy

Ambridge,Pa. W18 ..... 7.525
Camden,N.J. P13 ..... 7.70
Carnegie,Pa. C12 ..... 7.525
Chicago W18 ..... 7.525
Cleveland C20 ..... 7.525
Monaca,Pa. S17 ..... 7.525
Newark,N.J. W18 ..... 7.70
SpringCity,Pa. K3 ..... 7.70
Warren,O. C17 ..... 7.525

BARS, Reinforcing (To fabricators)

Ala.City,Ala. R2 ..... 4.30
Atlanta A11 ..... 4.50
Birmingham C15 ..... 4.30
Buffalo R2 ..... 4.30
Cleveland R2 ..... 4.30
Emeryville,Calif. J7 ..... 5.05
Fairfield,Ala. T2 ..... 4.30
Fairless,Pa. U5 ..... 4.45
Fontana,Calif. K1 ..... 5.00
Ft.Worth,Tex.(42) T4 ..... 4.90
Gary,Ind. U5 ..... 4.30
Houston 85 ..... 4.55

Ind.Harbor,Ind. I-2, Y1 4.30
Johnstown,Pa. B2 ..... 4.30
KansasCity,Mo. S5 ..... 4.55
Lackawanna,N.Y. B2 ..... 4.30
LosAngeles B3 ..... 5.00
Milton,Pa. M18 ..... 4.30
Minnequa,Colo. C10 ..... 4.75
Niles,Calif. P1 ..... 5.00
Pittsburg,Calif. C11 ..... 5.00
Pittsburgh J5 ..... 4.30
Portland,Oreg. O4 ..... 5.05
SandSprings,Okla. S5 ..... 4.80
Seattle B3, N14 P23 ..... 5.05
So.Chicago R2 ..... 4.30
So.Duquesne,Pa. U5 ..... 4.30
So.SanFrancisco B3 ..... 5.05
SparrowsPoint,Md. B2 ..... 4.30
Sterling,Ill.(1) N15 ..... 4.30
Sterling,Ill. N15 ..... 4.40
Struthers,O. Y1 ..... 4.30
Torrance,Calif. C11 ..... 5.00
Youngstown R2, U5 ..... 4.30

BARS, Reinforcing (Fabricated; to Consumers)

Johnstown,Pa. ¼-1" B2 ..... 5.70
KansasCity S5 ..... 6.50
LosAngeles B3 ..... 5.95
Marion,O. P11 ..... 5.55
Pittsburgh J5, U5 ..... 5.72
Seattle B3, N14, P23 ..... 6.15
So.SanFrancisco B3 ..... 6.00
SparrowsPt. ¼-1" B2 ..... 5.70
Williamsport,Pa. S19 ..... 5.60

RAIL STEEL BARS

Avis,Pa.(3) J8 ..... 4.25
ChicagoHts.(3) C2, I-2 ..... 4.20
ChicagoHts.(4) C2, I-2 ..... 4.30
Ft.Worth,Tex.(26) T4 ..... 4.75
Franklin,Pa.(3) P5 ..... 4.20
Franklin,Pa.(4) P5 ..... 4.30
Marion,O.(3) P11 ..... 4.15
Moline,Ill.(3) R2 ..... 4.30
Tonawanda(3) B12 ..... 4.15
Tonawanda(4) B12 ..... 4.30
Williamsport,Pa.(3) S19 4.30

BARS, Wrought Iron

Economy,Pa.(S.R.) B14 10.85
Economy,Pa.(D.R.) B14 13.50
Economy(Staybolt) B14 13.80
McK.Rks(S.R.) L5 ..... 10.85
McK.Rks.(D.R.) L5 ..... 14.75
McK.Rks.(Staybolt) L5 16.25

SHEETS

SHEETS, Hot-Rolled Steel (18 Gage and Heavier)

Ala.City,Ala. R2 ..... 4.05
Allenport,Pa. P7 ..... 4.05
Ashland,Ky.(8) A10 ..... 4.05
Cleveland J5, R2 ..... 4.05
Conshohocken,Pa. A3 ..... 4.10
Detroit(8) M1 ..... 4.15
Ecorse,Mich. G5 ..... 4.15
Fairfield,Ala. T2 ..... 4.05
Fairless,Pa. U5 ..... 4.10
Fontana,Calif. K1 ..... 4.825
Gary,Ind. U5 ..... 4.05
Geneva,Utah C11 ..... 4.15
GraniteCity,Ill. G4 ..... 4.25
Houston S5 ..... 4.30
Ind.Harbor,Ind. I-2, Y1 4.05
Irvin,Pa. U5 ..... 4.05
Kokomo,Ind. C16 ..... 4.15
Lackawanna,N.Y. B2 ..... 4.05
Mansfield,O. E6 (37) 4.05
Mansfield,O. E6(38) 4.80
Munhall,Pa. U5 ..... 4.05
Newport,Ky. N9 ..... 4.05
Niles,O. N12 ..... 4.05
Pittsburg,Calif. C11 ..... 4.75
Pittsburgh J5 ..... 4.05
Portsmouth,O. P12 ..... 4.05
Riverdale,Ill. A1 ..... 4.05
Sharon,Pa. S3 ..... 4.05
So.Chicago,Ill. W14 ..... 4.05
SparrowsPoint,Md. B2 ..... 4.05
Steubenville,O. W10 ..... 4.05
Warren,O. R2 ..... 4.05
Weirton,W.Va. W6 ..... 4.05
Youngstown U5, Y1 ..... 4.05

SHEETS, H.R. (19 ga. lighter)

Ala.City,Ala. R2 ..... 5.35
Kokomo,Ind. C16 ..... 5.20
Niles,O. N12 ..... 4.95

SHEETS, H.R. Alloy

Ind.Harbor,Ind. Y1 ..... 5.80
Youngstown Y1 ..... 5.80

SHEETS, H.R. (14 ga. heavier) High-Strength Low-Alloy

Cleveland J5, R2 ..... 6.10
Conshohocken,Pa. A3 ..... 6.15
Ecorse,Mich. G5 ..... 6.20
Fairfield, Ala. T2 ..... 6.10
Fairless,Pa. U5 ..... 6.15
Fontana,Calif. K1 ..... 6.875
Gary,Ind. U5 ..... 6.10
Ind.Harbor,Ind. I-2, Y1 6.10
Irvin,Pa. U5 ..... 6.10
Lackawanna(35) B2 ..... 6.10
Munhall,Pa. U5 ..... 6.10
Pittsburgh J5 ..... 6.10
Sharon,Pa. S3 ..... 6.10
So.Chicago,Ill. U5 ..... 6.10
SparrowsPoint(36) B2 ..... 6.10
Warren,O. R2 ..... 6.10
Weirton,W.Va. W6 ..... 6.10
Youngstown U5, Y1 ..... 6.10

SHEETS, Hot-Rolled Ingot Iron (18 Gage and Heavier)

Ashland,Ky.(8) A10 ..... 4.30
Cleveland R2 ..... 4.65
Ind.Harbor,Ind. I-2 ..... 4.30
Warren,O. R2 ..... 4.65

SHEETS, Cold-Rolled Steel (Commercial Quality)

Allenport,Pa. P7 ..... 4.95
Cleveland J5, R2 ..... 4.95
Conshohocken,Pa. A3 ..... 5.00
Ecorse,Mich. G5 ..... 5.05
Fairfield,Ala. T2 ..... 4.95
Fairless,Pa. U5 ..... 5.00
Follansbee,W.Va. F4 ..... 4.95
Fontana,Calif. K1 ..... 6.05
Gary,Ind. U5 ..... 4.95
GraniteCity,Ill. G4 ..... 5.15
Ind.Harbor,Ind. I-2, Y1 4.95
Irvin,Pa. U5 ..... 4.95
Lackawanna,N.Y. B2 ..... 4.95
Middletown,O. A10 ..... 4.95
Pittsburg,Calif. C11 ..... 5.90
Pittsburgh J5 ..... 4.95
Portsmouth,O. P12 ..... 4.95
SparrowsPoint,Md. B2 ..... 4.95
Warren,O. R2 ..... 4.95
Weirton,W.Va. W6 ..... 4.95
Youngstown Y1 ..... 4.95

SHEETS, Cold-Rolled High-Strength Low-Alloy

Cleveland J5, R2 ..... 7.50
Ecorse,Mich. G5 ..... 7.60
Fairless,Pa. U5 ..... 7.55
Fontana,Calif. K1 ..... 8.55
Gary,Ind. U5 ..... 7.50
IndianaHarbor,Ind. Y1 ..... 7.50
Irvin,Pa. U5 ..... 7.50
Lackawanna(37) B2 ..... 7.50
Pittsburgh J5 ..... 7.50
SparrowsPoint(38) B2 ..... 7.50
Warren,O. R2 ..... 7.50
Weirton,W.Va. W6 ..... 7.50
Youngstown Y1 ..... 7.50

SHEETS, Cold-Rolled Ingot Iron

Cleveland R2 ..... 5.55
Middletown,O. A10 ..... 5.45
Warren,O. R2 ..... 5.55

SHEETS, Culvert (16 Ga.)	Cu Alloy	Cu Fe
Ashland,Ky.	A10 6.50	....
Canton,O.	R2 6.50	7.10
Fairfield	T2 5.70	....
Gary,Ind.	U5 5.70	5.95
Ind.Harbor	I-2 5.70	5.95
Irvin,Pa.	U5 5.70	....
Kokomo,Ind.	C16 5.80	....
MartinsFry.,O.	W10 5.70	....
Newport,Ky.	N9 5.70	5.95
Pitts.,Calif.	C11 6.45	....
SparrowsPt.	B2 5.70	....

SHEETS, Culvert—Pure Iron

Ashland,Ky. A10 ..... 6.75
Gary,Ind. U5 ..... 5.95
MartinsFerry,O. W10 ..... 5.95

SHEETS, Galvanized Steel Hot-Dipped

Ala.City,Ala. R2 ..... 5.45‡
Ashland,Ky. A10 ..... 5.45*
Butler,Pa. A10 ..... 5.45†
Canton,O. R2 ..... 5.45‡
Delphos,O. N16 ..... 6.10‡
Dover,O. R1 ..... 5.45‡
Fairfield,Ala. T2 ..... 5.45†
Gary,Ind. U5 ..... 5.45*
GraniteCity,Ill. G4 ..... 5.65‡
Ind.Harbor,Ind. I-2 ..... 5.45†
Irvin,Pa. U5 ..... 5.45†
Kokomo,Ind. C16 ..... 5.55‡
MartinsFerry,O. W10 ..... 5.45*
Middletown,O. A10 ..... 5.45†
Newport,Ky. N9 ..... 5.45†
Niles,O. N12 ..... 5.45‡
Pittsburg,Calif. C11 ..... 6.20*
SparrowsPt.,Md. B2 ..... 5.45‡
Weirton,W.Va. W6 ..... 5.45*

*Continuous and noncontinuous. †Continuous. ‡Noncontinuous.

SHEETS, Wall Casing

Fontana,Calif. K1 ..... 6.325

SHEETS, Galvanized High-Strength Low-Alloy

Irvin,Pa. U5 ..... 8.20
SparrowsPoint(39) B2 ..... 8.20

SHEETS, Galvannealed Steel

Canton,O. R2 ..... 5.85
Irvin,Pa. U5 ..... 5.85
Kokomo,Ind. C16 ..... 5.95†
Newport,Ky. N9 ..... 5.85
Niles,O. N12 ..... 5.85

SHEETS, Galvanized Ingot Iron

Ashland,Ky.(8) A10 ..... 5.70
Canton,O. R2 ..... 6.20

SHEETS, Galvanized Ingot Iron (Hot-dipped Continuous)

Ashland,Ky. A10 ..... 5.70
Butler,Pa. A10 ..... 5.70
Middletown,O. A10 ..... 5.70

SHEETS, Electrogalvanized

Cleveland(28) R2 ..... 6.30
Niles,O.(28) R2 ..... 6.30
Weirton,W.Va. W6 ..... 6.15

SHEETS, Aluminum Coated

Butler,Pa. A10 ..... 8.625

SHEETS, Enameling Iron

Ashland,Ky.(8) A10 ..... 5.375
Cleveland R2 ..... 5.375
Gary,Ind. U5 ..... 5.375
GraniteCity,Ill. G4 ..... 5.575
Ind.Harbor,Ind. I-2 ..... 5.375
Irvin,Pa. U5 ..... 5.375
Middletown,O. A10 ..... 5.375
Niles,O. N12 ..... 5.375
Youngstown Y1 ..... 5.375

BLUED STOCK, 29 ga.

Follansbee,W.Va. F4 ..... 7.375
Follansbee(23) F4 ..... 6.60
Yorkville,O. W10 ..... 7.375

SHEETS, Long Terne Steel (Commercial Quality)

BeechBottom,W.Va. W10 5.85
Gary,Ind. U5 ..... 5.85
Mansfield,O. E6 ..... 5.85
Middletown,O. A10 ..... 5.85
Niles,O. N12 ..... 5.85
Weirton,W.Va. W6 ..... 5.85

SHEETS, Long Terne, Ingot Iron

Middletown,O., A10 ..... 6.25

Key to Producers

A1 Acme Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A5 Alloy Metal Wire Co.
A7 American Steel & Wire
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.

B1 Babcock & Wilcox Co.
B2 Bethlehem Steel Co.
B3 Beth. Pac. Coast Steel
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B8 Braeburn Alloy Steel
B9 Brainard Steel Div., Sharon Steel Corp.
B10 E. & G. Brooke, Wickwire Spencer Steel Div., Colo. Fuel & Iron
B11 Buffalo Bolt Co., Div. Buffalo-Eclipse Corp.
B12 Buffalo Steel Corp.
B14 A. M. Byers Co.
B15 J. Bishop & Co.

C1 Calstrip Steel Corp.
C2 Calumet Steel Div., Borg-Warner Corp.
C4 Carpenter Steel Co.
C5 Central Iron & Steel Div. Barium Steel Corp.
C7 Cleve. Cold Rolling Mills
C8 Cold Metal Products Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia-Geneva Steel
C12 Columbia Steel & Shaft.
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft.
C15 Connors Steel Div. H. K. Porter Co. Inc.
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire
C22 Claymont Steel Products Dept. Wickwire Spencer Steel Division
C23 Charter Wire Inc.
C24 G. O. Carlson Inc.
C31 Chester Blast Furnace Inc.

D2 Detroit Steel Corp.
D3 Detroit Tube & Steel
D4 Disston & Sons, Henry
D6 Driver Harris Co.
D7 Dickson Weatherproof Nail Co.
D8 Damascus Tube Co.
D9 Wilbur B. Driver Co.

E1 Eastern Gas & Fuel Assoc.
E2 Eastern Stainless Steel
E4 Electro Metallurgical Co.
E5 Elliott Bros. Steel Co.
E6 Empire Steel Corp.

F2 Firth Sterling Inc.
F3 Fitzsimons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div., Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
F7 Ft. Howard Steel & Wire
F8 Ft. Wayne Metals Inc.

G2 Globe Iron Co.
G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.

H1 Hanna Furnace Corp.
H7 Helical Tube Co.

I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.
I-6 Ivins, E., Steel Tube
I-7 Indiana Steel & Wire Co.

J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.

K1 Kaiser Steel Corp.
K2 Keokuk Electro-Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire
K7 Kenmore Metals Corp.

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Steel Co.
L5 Lockhart Iron & Steel
L6 Lone Star Steel Co.
L7 Lukens Steel Co.

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M6 Mercer Pipe Div., Sawhill Tubular Products
M8 Mid-States Steel & Wire
M12 Moltrup Steel Products
M13 Monarch Steel Co.
M14 McInnes Steel Co.
M16 Md. Fine & Special. Wire
M17 Metal Forming Corp.
M18 Milton Steel Prod. Div., Merritt-Chapman & Scott

N1 National-Standard Co.
N2 National Supply Co.
N3 National Tube Div.
N5 Nelsen Steel & Wire Co.
N6 NewEng.High Carb.Wire
N8 Newman-Crosby Steel
N9 Newport Steel Corp.
N12 Niles Rolling Mill Div.
N14 Nrthwst.Steel Roll. Mills
N15 Northwestern S.&W. Co.
N16 New Delphos Mfg. Co.

O3 Oliver Iron & Steel Corp.
O4 Oregon Steel Mills

P1 Pacific States Steel Corp.
P2 Pacific Tube Co.
P4 Phoenix Iron & Steel Co.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke & Chem.
P7 Pittsburgh Steel Co.
P11 Pollak Steel Co.
P12 Portsmouth Division Detroit Steel Corp.
P13 Precision Drawn Steel
P14 Pitts. Screw & Bolt Co.
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., Amer. Chain & Cable
P17 Plymouth Steel Co.
P19 Pitts. Rolling Mills
P20 Prod. Steel Strip Corp.
P23 Pacific Steel Rolling

R1 Reeves Steel & Mfg. Co.
R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R7 Rotary Electric Steel Co.
R8 RelianceDiv.,Eaton Mfg.
R9 Rome Mfg. Co.
R10 Rodney Metals Inc.

S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S4 Sharon Tube Co.
S5 Sheffield Steel Div., Armco Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S12 Spencer Wire Corp.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S17 Superior Drawn Steel Co.
S18 Superior Steel Corp.
S19 Sweet's Steel Co.
S20 Southern States Steel
S23 Superior Tube Co.
S25 Stainless Welded Products
S26 Specialty Wire Co. Inc.
S30 Sierra Drawn Steel Corp.

T2 Tenn. Coal & Iron Div.
T3 Tenn. Prod. & Chem.
T4 Texas Steel Co.
T5 Thomas Strip Division, Pittsburgh Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div. Am. Rad. & Stan. San.
T13 Tube Methods Inc.

U4 Universal-Cyclops Steel
U5 United States Steel Corp.
U6 U. S. Pipe & Foundry
U7 Ulbrich Stainless Steels
U8 U. S. Steel Supply Div.

V2 Vanadium-Alloys Steel
V3 Vulcan Crucible Steel Co.

W1 Wallace Barnes Co.
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W7 W.Va. Steel & Mfg. Co.
W8 West.Auto.Mach.Screw
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div., International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.
W19 Worcester Pressed Steel

Y1 Youngstown Sheet & Tube

STRIP

STRIP, Hot-Rolled Carbon

Ala.City,Ala.(27) R2 ...4.05
Allenport,Pa. P7 .....4.05
Alton,Ill. L1 .....4.225
Ashland,Ky.(8) A10 ....4.05
Atlanta A11 .....4.25
Bessemer,Ala. T2 .....4.05
Birmingham C15 .....4.05
Bridgeport,Conn.(10)S15 4.05
Buffalo(37) R3 .....4.05
Conshohocken,Pa. A3 ...4.10
Detroit M1 .....4.15
Ecorse,Mich. G5 .....4.15
Fairfield,Ala. T2 .....4.05
Fontana,Calif. K1 .....4.825
Gary,Ind. U5 .....4.05
Houston,Tex.(9) S5 ...4.30
Ind.Harbor,Ind. I-2, Y1.4.05
Johnstown,Pa.(25) B2 ..4.05
KansasCity,Mo.(9) S5 ..4.30
Lackaw'na,N.Y.(25) B2.4.05
LosAngeles(25) B3 .....4.80
Milton,Pa. M18 .....4.05
Minnequa,Colo. C10 ....5.15
NewBritain(10) S15 ....4.05
N.Tonawanda,N.Y. B11..4.05
Pittsburg,Calif. C11 ....4.80
Portsmouth,O. P12 .....4.05
Riverdale,Ill. A1 .....4.05
SanFrancisco S7 .....5.00
Seattle(25) B3, P23 ....5.05
Seattle N14 .....5.05
Sharon,Pa. S3 .....4.05
So.Chicago,Ill. W14 ....4.05
So.SanFrancisco(25) B3.4.80
SparrowsPoint,Md. B2 ..4.05
Sterling(1) N15 .....4.05
Sterling,Ill. N15 .....4.15
Torrance,Calif. C11 ....4.80
Warren,O. R2 .....4.05
Weirton,W.Va. W6 .....4.05
Youngstown U5 .....4.05

STRIP, Hot-Rolled Alloy

Bridgeport,Conn.(10)S15 6.45
Carnegie,Pa. S18 .....6.70
Fontana,Calif. K1 .....8.10
Gary,Ind. U5 .....6.70
Houston,Tex. S5 .....6.95
Ind.Harbor,Ind. Y1 ....6.70
KansasCity,Mo. S5 .....6.95
LosAngeles B3 .....7.90
NewBritn.,Conn.(10)S15 6.45
Newport,Ky. N9 .....6.70
Seattle P23 .....7.80
Sharon,Pa. S3 .....6.70
So.Chicago W14 .....6.70
Youngstown U5, Y1 ....6.70

STRIP, Hot-Rolled High-Strength Low-Alloy

Bessemer,Ala. T2 .....6.15
Conshohocken,Pa. A3 ..6.15
Ecorse,Mich. G5 .....6.25
Fairfield,Ala. T2 .....6.15
Fontana,Calif. K1 .....7.25
Gary,Ind. U5 .....6.15
Houston S5 .....6.55
Ind.Harbor,Ind. I-2, Y1.6.15
KansasCity,Mo. S5 .....6.75
Lackawanna,N.Y. B2 ..6.15
LosAngeles(25) B3 .....6.90
Seattle(25) B3, P23 ....7.15
Sharon,Pa. S3 .....6.15
So.SanFrancisco(25) B3.6.90
SparrowsPoint,Md. B2 ..6.15
Warren,O. R2 .....6.15
Weirton,W.Va. W6 .....6.15
Youngstown U5, Y1 ....6.15

STRIP, Hot-Rolled Ingot Iron

Ashland,Ky.(8) A10 ....4.30
Warren,O. R2 .....4.65

STRIP, Cold-Rolled Carbon

Anderson,Ind. G6 .....5.75
Baltimore T6 .....5.75
Bridgeport,Conn.(10)S15 5.75
Cleveland A7, J5 .....5.75
Conshohocken,Pa. A3 ..5.80
Dearborn,Mich. D3 ....5.85
Detroit P20 .....5.90
Detroit D2, M1 .....5.85
Dover,O. G6 .....5.75
Ecorse,Mich. G5 .....5.85
Follansbee,W.Va. F4 ...5.75
Fontana,Calif. K1 .....7.45
FranklinPark,Ill. T6 ....5.85
Ind.Harbor,Ind. I-2 ....5.85
Ind.Harbor,Ind. Y1 ....5.75
Indianapolis C8 .....5.90
Lackawanna,N.Y. B2 ...5.75
LosAngeles C1 .....7.80
Mattapan,Mass. T6 ....6.30
Middletown,O. A10 .....5.75
NewBedford,Mass. R10..6.20
NewBritain(10) S15 ....5.75
NewCastle,Pa. B4, E5 ..5.75
NewHaven,Conn. A7 ....6.50
NewHaven,Conn. D2 ....6.20
Pawtucket,R.I. R3 .....6.40
Pawtucket,R.I. N8 .....6.20
Pittsburgh J5 .....5.75
Portsmouth,O. P12 .....5.75
Riverdale,Ill. A1 .....5.85
Rome,N.Y.(32) R6 .....5.75
Sharon,Pa. S3 .....5.75
SparrowsPt.,Md. B2 ....5.75
Trenton,N.J.(31) R5 ...7.30
Wallingford,Conn. W2 ..6.20
Warren,O. B9, R2, T5..5.75
Weirton,W.Va. W6 .....5.75
Worcester,Mass. A7 ....6.60
Youngstown C8, Y1 ....5.75

STRIP, Cold-Rolled Alloy

Carnegie,Pa. S18 .....12.45
Cleveland A7 .....12.45
Dover,O. G6 .....12.45
Fontana,Calif. K1 .....14.55
FranklinPark,Ill. T6 ...12.45
Harrison,N.J. C15 .....12.45
Mattapan,Mass. T6 ....12.80
Pawtucket,R.I. N8 .....12.80
Sharon,Pa. S3 .....12.45
Worcester,Mass. A7 ...12.75
Youngstown C8 .....12.90

STRIP, Cold-Rolled High-Strength Low-Alloy

Cleveland A7, J5 .....8.60
Dearborn,Mich. D3 ....8.70
Dover,O. G6 .....8.60
Ecorse,Mich. G5 .....8.70
Ind.Harbor,Ind. Y1 ....8.60

STRIP, Cold-Finished Spring Steel (Annealed)	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Baltimore T6	5.75	8.35	9.30	11.45	14.15
Bridgeport,Conn.(10) S15	5.75	8.05	9.00	11.15	13.85
Bristol,Conn. W1	...	...	9.30	11.45	....
Carnegie,Pa. S18	...	8.05	9.00	11.15	13.85
Cleveland A7	5.75	8.05	9.00	11.15	13.85
Cleveland C7	...	8.05	9.00	11.15	13.85
Dearborn,Mich. D3	5.85	8.25	9.20	....	....
Detroit D2	5.85	8.25	9.20	10.95	....
Dover,O. G6	5.85	8.05	9.00	11.15	13.85
FranklinPark,Ill. T6	5.85	8.05	9.00	11.15	13.85
Harrison,N.J. C15	...	...	9.30	11.45	14.15
Indianapolis C8	6.00	8.20	9.00	11.15	13.85
Mattapan,Mass. T6	6.30	8.35	9.30	11.45	14.15
NewBritn.,Conn.(10) S15	5.75	8.05	9.00	11.15	13.85
NewCastle,Pa. B4	5.75	8.05	9.00	11.15	....
NewCastle,Pa. E5	5.75	8.05	9.00	11.15	13.85
NewHaven,Conn. D2	6.20	8.35	9.30	11.25	....
New York W3	...	8.35	9.30	11.45	14.15
Pawtucket,R.I. N8	6.30	8.35	9.30	11.45	14.15
Riverdale,Ill. A1	5.85	8.05	9.00	11.15	13.85
Rome,N.Y.(32) R6	5.75	8.05	9.00	10.95	13.25
Sharon,Pa. S3	5.75	8.05	9.00	11.15	13.85
Trenton,N.J. R5	...	8.35	9.30	11.45	14.15
Wallingford,Conn. W2	6.20	8.35	9.30	11.45	14.15
Warren,O. T5	5.75	8.05	9.00	11.15	13.85
Weirton,W.Va. W6	5.75	8.05	9.00	11.15	13.85
Worcester,Mass. A7, T6	6.60	8.35	9.30	11.45	14.15
Youngstown C8	5.85	8.05	9.00	11.15	13.85
Spring Steel (Tempered)					
Bristol,Conn. W1	...	...	12.90	15.60	....
Buffalo W12	...	...	12.90	....	....
FranklinPark,Ill. T6	...	...	13.40	16.10	19.50
Harrison,N.J. C15	...	...	12.90	15.60	19.00
NewYork W3	...	...	12.90	15.60	19.00
Trenton,N.J. R5	...	...	12.90	15.60	19.00
Worcester,Mass. A7, T6	...	...	12.90	15.60	19.00
Worcester,Mass. W12	...	...	12.90	....	....
Youngstown C8	...	...	13.25	15.95	19.35

Lackawanna,N.Y. B2 ..8.425
Pittsburgh J5 .....8.60
Sharon,Pa. S3 .....8.60
SparrowsPoint,Md. B2..8.425
Warren,O. R2 .....8.60
Weirton,W.Va. W6 .....8.60
Youngstown Y1 .....8.60

STRIP, Cold-Rolled Ingot Iron

Warren,O. R2 .....6.35

STRIP, Electrogalvanized

Cleveland A7 .....5.75*
Dover,O. G6 .....5.75*
Riverdale,Ill. A1 .....5.85*
Youngstown C8 .....5.75*
Warren,O. B9, T5 .....5.75*
Weirton,W.Va. W6 .....5.75*
Worcester,Mass. A7 ..6.60*

*Plus galvanizing extras.

STRIP, Galvanized (Continuous)

Sharon,Pa. S3 .....6.15
Warren,O. B9 .....6.15

TIGHT COOPERAGE HOOP

Atlanta A11 .....4.775
Riverdale,Ill. A1 .....4.625
Sharon,Pa. S3 .....4.475
Youngstown U5 .....4.475

SILICON STEEL

H.R. SHEETS (22 Ga., cut lengths)	Field	Armature	Electric Motor		Dynamo
BeechBottom,W.Va. W10	....	...	9.10	10.10	11.00
Brackenridge,Pa. A4	....	...	9.10	10.10	11.00
Mansfield,O. E6	8.025	8.50	9.10	10.10	11.00
Newport,Ky. N9	8.025	8.50	9.10	10.10	11.00
Niles,O. N12	8.025	8.50	9.10	10.10	....
Vandergrift,Pa. U5	....	8.50	9.10	10.10	11.00
Warren,O. R2	8.025	8.50	9.10	10.10	11.00
Zanesville,O. A10	....	8.50	9.10	10.10	11.00

C.R. COILS & CUT LENGTHS, (22 Ga.) Fully Processed (Semiprocessed ½¢ lower)	Field	Armature	Electric Motor		Dynamo
Brackenridge,Pa. A4	....	....	9.85	10.85	11.75
GraniteCity,Ill. G4	8.425*	8.95*	9.55*	10.55*	....
IndianaHarbor,Ind. I-2	8.225	8.75*	9.35*	....	....
Vandergrift,Pa. U5	....	9.25†	9.85†	10.85†	11.75†
Vandergrift,Pa. U5	8.225*	8.75*	9.35*	10.35*	11.25*
Warren,O. R2	8.225†	9.25	9.85	10.85	11.75
Zanesville,O. A10	....	9.25	9.85	10.85	11.75

H.R. SHEETS (22 Ga., cut lengths)	Transformer Grade T-72	T-65	T-58	T-52
BeechBottom,W.Va. W10	11.95	13.50	13.00	14.00
Brackenridge,Pa. A4	11.95	....	....	....
Newport,Ky. N9	11.95	....	....	....
Vandergrift,Pa. U5	11.95	12.50	13.00	14.00
Zanesville,O. A10	11.95‡	12.50‡	13.00‡	14.00‡

C.R. COILS & CUT LENGTHS (22 Ga.)	Grain Oriented T-100	T-90	T-80	T-73	T-72
Brackenridge,Pa. A4	....	15.00	16.00	17.10	....
Butler,Pa. A10	....	....	16.00	17.10	....
Vandergrift,Pa. U5	14.00	15.00	16.00	17.10	12.70
Warren,O. R2	....	....	....	....	12.70‡

* Semiprocessed. † Fully processed only. ‡ Coils annealed; semiprocessed ½¢ lower. ‖ Coils, ¼-cent higher.

TIN MILL PRODUCTS

TIN PLATE Electrolytic (Base Box)	0.25 lb	0.50 lb	0.75 lb
Aliquippa,Pa. J5	$7.50	$7.75	$8.15
Fairfield,Ala. T2	7.60	7.85	8.25
Fairless,Pa. U5	7.60	7.85	8.25
Gary,Ind. U5	7.50	7.75	8.15
GraniteCity,Ill. G4	7.60	7.85	8.25
IndianaHarbor,Ind. I-2, Y1	7.50	7.75	8.15
Irvin,Pa. U5	7.50	7.75	8.15
Niles,O. R2	7.50	7.75	8.15
Pittsburg,Calif. C11	8.25	8.50	8.90
SparrowsPoint,Md. B2	7.60	7.85	8.25
Weirton,W.Va. W6	7.50	7.75	8.15
Yorkville,O W10	7.50	7.75	8.15

ELECTROTIN (22-27 Gage; Dollars per 100 lb)			
Aliquippa,Pa. J5	6.175	....	....
Niles,O. R2	6.175	6.375	6.575

TIN PLATE, American Coke (Base Box)	1.25 lb	1.50 lb
Aliquippa,Pa. J5	$8.80	$9.05
Fairfield,Ala. T2	8.90	9.15
Fairless,Pa. U5	8.90	9.15
Gary,Ind. U5	8.80	9.05
Ind.Har, I-2, Y1	8.80	9.05
Irvin,Pa. U5	8.80	9.05
Pitts.,Cal. C11	9.55	9.80
Sp.Pt.,Md. B2	8.90	9.15
Warren,O. R2	8.80	9.05
Weirton,W.Va. W6	8.80	9.05
Yorkville,O. W10	8.80	9.05

BLACK PLATE (Base Box)	
Aliquippa,Pa. J5	$6.60
Fairfield,Ala. T2	6.70
Fairless,Pa. U5	6.70
Gary,Ind. U5	6.60
GraniteCity,Ill. G4	6.70
Ind.Harbor,Ind. I-2, Y1	6.60
Irvin,Pa. U5	6.60
Niles,O. R2	6.60
Pittsburg,Calif. C11	7.35
SparrowsPoint,Md. B2	6.70

HOLLOWARE ENAMELING Black Plate (29 gage)	
Follansbee,W.Va. F4	6.20
Gary,Ind. U5	6.20
GraniteCity,Ill. G4	6.30
Ind.Harbor,Ind. Y1	6.20
Irvin,Pa. U5	6.20
Yorkville,O. W10	6.20

MANUFACTURING TERNES (Special Coated; Base Box)	
Gary,Ind. U5	$7.85
Irvin,Pa. U5	7.85
Yorkville,O. W10	7.85

MANUFACTURING TERNES (Light Coated, 6 lb; Base Box)	
Yorkville,O. W10	$8.75

ROOFING SHORT TERNES (8 lb Coated)	
Gary,Ind. U5	9.85

WIRE

WIRE, Manufacturers Bright, Low Carbon

AlabamaCity,Ala. R2 ...5.75
Aliquippa,Pa. J5 .....5.75
Alton,Ill. L1 .....5.925
Atlanta A11 .....5.95
Bartonville,Ill. K4 .....5.85
Buffalo W12 .....5.75
Chicago W13 .....5.75
Cleveland A7, C20 .....5.75
Crawfordsville,Ind. M8..5.85
Donora Pa. A7 .....5.75
Duluth,Minn. A7 .....5.75
Fairfield,Ala. T2 .....5.75
Fostoria,O.(24) S1 .....5.95
Houston S5 .....6.00
Jacksonville,Fla. M8 ....6.27
Johnstown,Pa. B2 .....5.75
Joliet,Ill. A7 .....5.75
KansasCity,Mo. S5 .....6.00
Kokomo,Ind. C16 .....5.85
LosAngeles B3 .....6.70
Minnequa,Colo. C10 ....6.00
Monessen,Pa. P7 .....5.75
Newark 6-8 ga. I-1 ....6.40
No Tonawanda B11 ....5.75
Palmer,Mass. W12 .....6.05
Pittsburg,Calif C11 ....6.70
Portsmouth,O. P12 .....5.75
Rankin,Pa. A7 .....5.75
So.Chicago,Ill. R2 .....5.75
So.SanFrancisco C10 ...6.70
SparrowsPoint,Md. B2 ..5.85
Sterling,Ill.(1) N15 ...5.75
Sterling,Ill. N15 .....5.85
Struthers,O. Y1 .....5.75
Waukegan,Ill. A7 .....5.75
Worcester,Mass. A7 ....6.05

WIRE, MB Spring, High Carbon

Aliquippa,Pa. J5 .....7.20
Alton,Ill. L1 .....7.375
Bartonville,Ill. K4 .....7.30
Buffalo W12 .....7.20
Cleveland A7 .....7.20
Donora,Pa. A7 .....7.20
Duluth,Minn. A7 .....7.20
Fostoria,O. S1 .....7.20
Johnstown,Pa. B2 .....7.20
LosAngeles B3 .....8.15
Milbury,Mass.(12) N8 ..7.50
Minnequa,Colo. C10 ....7.45
Monessen,Pa. P7, P16..7.20
Muncie,Ind. I-7 .....7.40
Palmer,Mass. W12 .....7.50
Pittsburg,Calif. C11 ....8.15
Portsmouth,O. P12 .....7.20
Roebling,N.J. R5 .....7.50
So.Chicago,Ill. R2 .....7.20
So.SanFrancisco C10 ...8.15
SparrowsPt.,Md. B2 ....7.30
Struthers,O. Y1 .....7.20
Trenton,N.J. A7 .....7.50
Waukegan,Ill. A7 .....7.20
Worcester A7,J4,T6,W12 7.50

WIRE, Upholstery Spring

Aliquippa,Pa. J5 .....6.90
Alton,Ill. L1 .....7.975
Buffalo W12 .....6.90
Cleveland A7 .....6.90
Donora,Pa. A7 .....6.90
Duluth,Minn. A7 .....6.90
Johnstown,Pa. B2 .....6.90
KansasCity,Mo. S5 .....7.50
LosAngeles B3 .....7.85
Minnequa,Colo. C10 ...7.975
Monessen,Pa. P7, P16...6.90
NewHaven,Conn. A7 ....7.20
Palmer,Mass. W12 .....7.20
Pittsburg,Calif. C11 ....7.85
Portsmouth,O. P12 .....6.90
Roebling,N.J. R5 .....7.20
So.Chicago,Ill. R2 .....6.90
So.SanFrancisco C10 ...7.85
SparrowsPoint,Md. B2 ..7.00
Struthers,O. Y1 .....6.90
Trenton,N.J. A7 .....7.20
Waukegan,Ill. A7 .....6.90
Worcester,Mass. A7 ....7.20

WIRE, Fine & Weaving (8" Coils)

Alton,Ill. L1 .....11.375
Bartonville,Ill. K4 .....11.30
Buffalo W12 .....11.20
Chicago W13 .....11.20
Cleveland A7 .....11.30
Crawfordsville,Ind. M8..11.30
Fostoria,O. S1 .....11.20
Jacksonville,Fla. M8 ..11.72
Johnstown,Pa. B2 .....11.20
Kokomo,Ind. C16 .....11.20
Minnequa,Colo. C10 ...10.96
Monessen,Pa. P16 .....11.20
Muncie,Ind. I-7 .....11.40
Palmer,Mass. W12 .....11.50
Roebling,N.J. R5 .....11.50
So.SanFrancisco C10 ..11.55
Waukegan,Ill. A7 .....11.20
Worcester,Mass. A7,T6.11.50

WIRE, Galv'd ACSR for Cores

Bartonville,Ill. K4 .....9.90
Buffalo W12 .....9.90
Johnstown,Pa. B2 .....9.90
Minnequa,Colo. C10 ..10.025
Monessen,Pa. P16 .....9.90
Muncie,Ind. I-7 .....10.10
Portsmouth,O. P12 .....9.90
Roebling,N.J. R5 .....10.20
SparrowsPt.,Md. B2 ...10.00

ROPE WIRE (A)

Alton,Ill. L1 .....9.75
Bartonville,Ill. K4 .....9.75
Buffalo W12 .....9.75
Fostoria,O. S1 .....9.75
Johnstown,Pa. B2 .....9.75
Monessen,Pa. P7, P16 ..9.75
Muncie,Ind. I-7 .....9.95
Palmer,Mass. W12 .....10.05
Portsmouth,O. P12 .....9.75
Roebling,N.J. R5 .....10.05
SparrowsPt. B2 .....9.85
Struthers,O. Y1 .....9.75
Worcester J4, T6 .....9.45

(A) Plow and Mild Plow; add 0.25c for Improved Plow.

WIRE
(Continued)

WIRE, Tire Bead

Alton,Ill L1	13.25
Bartonville,Ill. K4	13.25
Monessen, Pa. P16	13.15
Portsmouth,O. P12	13.15
Roebling,N.J. R5	13.45

WIRE, Cold-Rolled Flat

Anderson,Ind. G6	7.95
Baltimore T6	8.25
Buffalo W12	7.95
Cleveland A7	7.95
Crawfordsville,Ind. M8	8.05
Dover,O. G6	7.95
Fostoria,O. S1	7.95
FranklinPark,Ill. T6	8.05
Kokomo,Ind. C16	8.05
Massillon,O. R8	7.95
Milwaukee C23	8.15
Monessen,Pa. P7, P16	7.95
Pawtucket,R.I. N8	8.25
Rome,N.Y.(32) R6	7.95
Trenton,N.J. R5	8.25
Worcester A7, T6, W12	8.25

WIRE, Merchant Quality

(6 to 8 gage)	An'ld Galv.
Ala.City,Ala. R2	6.90 7.30**
Aliquippa J5	6.90 7.425§
Atlanta A11	7.00 7.55
Bartonville(48) K4	7.00 7.55
Buffalo W12	6.90 7.30†
Cleveland A7	6.90 ....
Crawfordsville M8	7.00 7.55
Donora,Pa. A7	6.90 7.30†
Duluth,Minn. A7	6.90 7.30†
Fairfield T2	6.90 7.30†
Houston,Tex. S5	7.15 7.55†
Jacks'ville,Fla. M8	7.425 7.95
JohnstownB2(48)	6.90 7.45*
Joliet,Ill. A7	6.90 7.30†
KansasCity,Mo. S5	7.15 7.55†
Kokomo C16	7.00 7.40†
LosAngeles B3	7.85 ....
Minnequa C10	7.15 7.55**
Monessen P7 (48)	6.90 7.45
Palmer W12	7.20 7.60†
Pitts.,Calif. C11	7.85 8.25†
Portsmouth,O. P12	6.90 ....
Rankin A7	6.90 7.30†
So.Chicago R2	6.90 7.30**
S.S.Fran. C10	7.85 8.25**
SparrwsPt.B2(48)	7.00 7.55*
Sterling(1)(48)N15	6.90 7.45
Struthers,O.(48)Y1	6.90 7.40‡
Worcester A7	7.20 ....

*Based on 11c zinc; †5c zinc; ‡ Less than 10c zinc; **Subject to zinc equalization extras.

WOVEN FENCE, 9-15½Ga. Col.

Ala.City,Ala. R2	146**
Ala.City, 17 ga. R2	241**
Ala.City, 18 ga. R2	251**
Allq'ppa,Pa.9-14½ga.J5	149§
Atlanta A11	151
Bartonville,Ill. K4	151
Crawfordsville,Ind. M8	151
Donora,Pa. A7	146†
Duluth,Minn. A7	146†
Fairfield,Ala. T2	146†
Houston,Tex. S5	151†
Johnstown,Pa.(43) B2	149
Joliet,Ill. A7	146†
KansasCity,Mo. S5	151†
Kokomo,Ind. C16	148†
Minnequa,Colo. C10	154**
Monessen,Pa. 9 ga. P17	149
Pittsburg,Calif. C11	169†
Rankin,Pa. A7	146†
So.Chicago,Ill. R2	146**
Sterling,Ill.(1) N15	149

†Based on 5c zinc; *11c zinc; § 10c zinc; **Subject to zinc equalization extras.

BALE TIES, Single Loop

	Col.
AlabamaCity,Ala R2	155
Atlanta A11	157
Bartonville,Ill. K4	157
Crawfordsville,Ind. M8	157
Donora,Pa. A7	155
Duluth,Minn.A7	155
Fairfield,Ala. T2	155
Joliet,Ill. A7	155
Houston S5	160
KansasCity,Mo. S5	160
Kokomo,Ind C16	157
Minnequa,Colo. C10	160
Pittsburg,Calif. C11	179
So.Chicago,Ill. R2	155
So.SanFran.,Calif. C10	179
SparrowsPoint,Md. B2	157
Sterling,Ill.(1) N15	155

WIRE, Barbed

	Col.
AlabamaCity,Ala. R2	159**
Aliquippa J5	156§
Atlanta A11	164
Bartonville,Ill. K4	164
Crawfordsville,Ind. M8	164
Donora,Pa. A7	159†
Duluth,Minn. A7	159†
Fairfield,Ala. T2	159†
Houston,Tex. S5	164
Johnstown,Pa. B2	162*
Joliet,Ill. A7	159†
KansasCity,Mo. S5	164†
Kokomo,Ind. C16	161†
Minnequa,Colo. C10	165**
Monessen,Pa. P7	162
Pittsburg,Calif. C11	179†
Rankin,Pa. A7	159†
So.Chicago,Ill. R2	159**
S.SanFrancisco C10	179**
SparrowsPoint,Md. B2	164*
Sterling,Ill. (1) N15	162

†Based on 5c zinc; *11c zinc; §10c zinc; **Subject to zinc equalization extras.

WIRE (16 gage)	An'ld Galv.	Stone Stone
Ala.City R2	13.15	14.70**
Bartonville K4	13.25	15.10
Buffalo W12	13.15	....
Cleveland A7	13.15	....
Crawfrdsville M8	13.25	15.10
Fostoria,O. S1	13.25	14.80†
Johnstown B2	13.15	15.00*
Kokomo C16	13.25	14.80†
Minnequa C10	13.40	15.10**
Palmer,Mas.W12	13.15	14.70†
Pitts.,Calif. C11	13.80	15.05†
So.Chicago R2	13.15	14.70
SparrowsPt. B2	13.25	15.10*
Sterling(1) N15	13.15	15.00
Waukegan A7	13.15	14.70†
Worcester A7	13.45	....

* Based on 11c zinc; † 5c zinc; § 10c zinc; **Subject to zinc equalization extras.

NAILS, Stock
To dealers & mfrs. (7)

	Col.
AlabamaCity,Ala. R2	137
Aliquippa,Pa. J5	137
Atlanta A11	139
Bartonville,Ill. K4	139
Chicago,Ill. W13	137
Cleveland A9	142
Crawfordsville,Ind. M8	139
Donora,Pa. A7	137
Duluth,Minn. A7	137
Fairfield,Ala. T2	137
Galveston,Tex. D7	139
Houston,Tex. S5	142
Johnstown,Pa. B2	137
Joliet,Ill. A7	137
KansasCity,Mo. S5	142
Kokomo,Ind. C16	139
Minnequa Colo. C10	142
Monessen,Pa. P7	137
Pittsburg,Calif. C11	158
Rankin,Pa. A7	137
So.Chicago,Ill. R2	137
SparrowsPt.,Md. B2	139
Sterling,Ill.(1) N15	137
Worcester,Mass. A7	143

NAILS, CUT (100 lb keg)
To dealers (33)

Conshohocken,Pa. A2	$8.30
Wheeling,W.Va. W10	8.30

STAPLES, Polished Stock
To dealers & mfrs. (7)

	Col.
Aliquippa,Pa. J5	138
Atlanta A11	140
Bartonville,Ill. K4	139
Crawfordsville,Ind. M8	139
Donora,Pa. A7	138
Duluth,Minn. A7	138
Fairfield,Ala. T2	138
Johnstown,Pa. B2	138
Joliet,Ill. A7	138
Kokomo,Ind. C16	139
Minnequa,Colo. C10	142
Monessen,Pa. P7	137
Pittsburg,Calif. C11	157
Rankin,Pa. A7	138
SparrowsPt.,Md. B2	140
Sterling,Ill. (1) N15	137
Worcester,Mass. A7	144

FENCE POSTS

	Col.
ChicagoHts.,Ill. C2, I-2	150
Duluth,Minn. A7	150
Franklin,Pa. F3	150
Johnstown,Pa. B2	150
Marion,O. P11	150
Minnequa,Colo. C10	155
Moline,Ill. R2	150
So.Chicago,Ill. R2	150
Tonawanda,N.Y. B12	150
Williamsport,Pa. S19	150

BOLTS, NUTS

CARRIAGE, MACHINE BOLTS
(Base discounts, per cent off list, f.o.b. midwestern plants)

4 in. and shorter:	
⅛-in. & smaller diam	2
Over 4 in. through 6 in.:	
⅛ in. & smaller diam	+2
6 in. and shorter:	
⅞-in. and ⅝-in.	+4
¾ in. and larger	+6
Longer than 6 in.:	
All diameters	+15
Lag bolts, all diams.:	
6 in. and shorter	6
Over 6 in. long	+2
Ribbed Necked Carriage	+4
Blank	10
Plow	23
Step, Elevator, Tap and Sleigh Shoes	10
Tire Bolts	+2
Boiler & Fitting-Up Bolts	21

NUTS

H.P. and C.P., regular & heavy:	
Square, all sizes	55
H.P., Hex. regular & heavy:	
⅝" and smaller	55
⅞" to 1⅛", inclusive	55
1⅛" to 1½", inclusive	60
1⅝" and larger	55
C.P. Hex regular & heavy:	
All sizes	55
Hot Galv. Nuts (all types):	
⅝" or smaller	38
⅞" to 1⅛", inclusive.	41
Finished Hex Nuts:	
New standard, all sizes	55
Semifinished & Slotted Hex:	
Regular and heavy, all sizes	55

SQUARE HEAD SET SCREWS
(1035 steel; packaged; per cent off list)

1 in. diam. x 6 in. and shorter	34
1 in. and smaller diam. x over 6 in.	20

HEADLESS SET SCREWS
(Packaged; per cent off list)

No. 10 and smaller	34
¼ in. diam. & larger	14
N.F. thread, all diams.	8

STEEL STOVE BOLTS
(F.o.b. plant, per cent off list in packages)

Plain finish	43
Plated finishes	23

HEXAGON CAP SCREWS
(1020 steel; packaged; per cent off list)

6 in. or shorter:	
¼ in. through ⅝-in.	28
⅝-in. through 1 in.	15
Longer than 6 in.:	
½-in. through ⅝-in.	30
⅝-in. through 1 in.	7

RIVETS

F.o.b. Cleveland, and/or freight equalized with Pittsburgh, f.o.b. Chicago, and/or freight equalized with Birmingham except where equalization is too great.

Structural ½-in., larger 9.25
⅞-in. under..List less 37%

WASHERS, WROUGHT

F.o.b. shipping point, to jobbers ..... List

BOILER TUBES

Net base c.l. prices, dollars per 100 ft, mill; minimum wall thickness, cut lengths 10 to 24 ft, inclusive.

O.D. In.	B.W. Gage	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.
1	13	....	19.00	19.00
1¼	13	....	23.21	18.77
1½	13	21.40	25.65	20.75
1⅝	13	25.28	30.31	24.53
2	13	28.33	33.97	27.48
2¼	13	31.91	38.26	30.95
2½	12	34.63	41.53	33.59
2⅝	12	38.15	45.74	37.00
2¾	12	41.31	49.53	40.07
3	12	44.00	52.82	42.72

RAILWAY MATERIALS

	Std. No. 1	Std. No. 2	All No. 2	Std. Tee Rails 60 lb Under
RAILS				
Bessemer,Pa. US	4.45	4.35	4.40	5.35
Ensley,Ala. T2	4.45	4.35	...	5.35
Fairfield,Ala. T2	...	...	...	5.35
Gary,Ind. US	4.45	4.35	4.40	...
IndianaHarbor,Ind. I-2	4.45	4.35	4.40	...
Johnstown,Pa. B2	...	...	...	(16)5.35
Lackawanna,N.Y. B2	4.45	4.35	...	5.35
Minnequa,Colo. C10	4.45	4.35	...	5.35
Steelton,Pa. B2	4.45	4.35	...	5.35
Williamsport,Pa. S19	...	...	...	5.35

TIE PLATES

Fairfield,Ala. T2	5.275
Gary,Ind. US	5.275
Ind.Harbor,Ind. I-2	5.275
Lackawanna,N.Y. B2	5.275
Minnequa,Colo. C10	5.275
Seattle B3	5.425
Steelton,Pa. B2	5.275
Torrance,Calif. C11	5.425

TRACK BOLTS (20) Treated

Cleveland R2	11.50
KansasCity,Mo. S5	11.50
Lebanon,Pa. B2	11.50
Minnequa, Colo. C10	11.50
Pittsburgh O3, P14	11.50
Seattle B3	12.00

AXLES

Ind.Harbor,Ind. S13	6.75
Johnstown,Pa. B2	6.75

JOINT BARS

Bessemer,Pa. US	5.425
Fairfield,Ala. T2	5.425
Ind.Harbor,Ind. I-2	5.425
Joliet,Ill. US	5.425
Lackawanna,N.Y. B2	5.425
Minnequa,Colo. C10	5.425
Steelton,Pa. B2	5.425

SCREW SPIKES

Cleveland R2	11.00

STANDARD TRACK SPIKES

Fairfield,Ala. T2	7.30
Ind.Harbor,Ind. I-2, Y1	7.30
KansasCity,Mo. S5	7.30
Lebanon,Pa. B2	7.30
Minnequa,Colo. C10	7.30
Pittsburgh J5	7.30
Seattle B3	7.80
So.Chicago,Ill. R2	7.30
Struthers,O. Y1	7.30
Youngstown R2	7.30

METAL POWDERS

(Per pound, f.o.b. shipping point in ton lots for minus 100 mesh, except as otherwise noted)

	Cents
Sponge iron: 98+% Fe, annealed.	15.25
Unannealed:	
Minus 100 mesh	11.75
Minus 35 mesh	9.25
Minus 30 mesh	9.00
Swedish, c.l.f. N.Y., c.l., in bags	11.35
Domestic (Swedish), f.o.b. Riverton, N. J., in bags	9.50
Electrolytic iron:	
Melting stock, 99.91% Fe, irregular fragments of ¼ in. x 1.5 in.	22.00
Annealed, 99.5% Fe	36.50
Unannealed (99+% Fe)	32.50
Unannealed (99+% Fe) (minus 325 mesh)	52.00
Powder Flakes (minus 16, plus 100 mesh)	31.50
Carbonyl iron: 97.9-99.8% size 5 to 10 microns—63.00-148.50	
Aluminum:	
Atomized, 500 lb drums, frgt. allowed:	
Carlots	30.00
Ton lots	32.00
Antimony, 500 lb lots	32.00*
Brass, 5000-lb lots	39.75-57.25†
Bronze, 5000-lb lots	46.75-53.00†
Copper:	
Electrolytic	13.75*
Reduced	13.75*
Lead	7.50*
Manganese:	
Minus 35 mesh	61.00
Minus 100 mesh	67.00
Minus 200 mesh	72.00
Nickel, unannealed	94.00
Nickel-Silver, 5000-lb lots	45.50‡
Nickel-Silver, 5000-lb lots	49.00**
Phosphor-Bronze, ¼-ton lots	58.50
Silicon	43.50
Solder	7.00*
Stainless Steel, 302	91.00
Tin	14.50*
Zinc, 5000-lb lots	17.25-31.00‡
Tungsten Melting grade, 99% 60 to 200 mesh:	Dollars
1000 lb and over	4.95
Less than 1000 lb	5.10
Chromium, electrolytic 99.2% Cr min.	5.50

*Plus cost of metal. †Depending on composition. ‡Depending on mesh. §70% Cu, 30% Zn, 10% Ni; **64% Cu 18% Zn, 18% Ni.

Footnotes

(1) Chicago base.
(2) Angles, flats, bands.
(3) Merchant.
(4) Reinforcing.
(5) 1¼" to 1 7/16"; 1 7/16" to 1 15/16" 4.75c; 1 15/16" to 2 5/16" 5.15c.
(6) Chicago or Birm. base.
(7) To jobbers, 5 cnts lower.
(8) 16 gage and heavier.
(9) 6 in. and narrower.
(10) Pittsburgh base.
(11) Cleveland & Pitts. base.
(12) Worcester, Mass., base.
(13) Add 0.25c for 17 Ga. & heavier.
(14) Gage 0.142 to 0.249 in.; for gage 0.142 and lighter, 5.80c.
(15) ⅝" and thinner.
(16) 40 lb and under.
(17) Plate only; 0.25 in. & heavier.
(18) To dealers.
(19) Chicago & Pitts. base.
(20) 0.25 off for untreated.
(21) New Haven, Conn., base.
(22) Del. San Francisco Bay area.
(23) 20 Ga. 28" wide.
(24) Deduct 0.10c, finer than 15 Ga.
(25) Bar mill basis.
(26) Reinforcing mill lengths, to fabricators; to consumers, 4.95c.
(27) Bar mill sizes.
(28) Bonderized.
(29) Youngstown base.
(30) Sheared; for universal mill add 0.45c for carbon, add 0.40c for alloy and 0.30c H.S.-L.A.
(31) Widths over ⅝ in.; 0.65c for widths ⅝ in. and under by 0.125 in. and thinner.
(32) Buffalo base.
(33) To jobbers, deduct 50c.
(34) 0.05c for cut lengths.
(35) 72" and narrower.
(36) 54" and narrower.
(37) 13 gage & heavier; 60" & narrower.
(38) 14 gage & lighter; 48" & narrower.
(39) 48" and narrower.
(40) Lighter than 0.225"; 0.035" and heavier, 0.25c higher.
(41) 0.10c for cut lengths.
(42) Mill lengths, f.o.b. mill; deld. to mill zone or within switching limits, 0.10c.
(43) 9-14½ gage.
(48) 6-7 gage.

SEAMLESS STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	2		2½		3		3½		4		5		6	
List Per Ft	37c		58.5c		76.5c		92c		$1.09		$1.48		$1.92	
Pounds Per Ft	3.68		5.82		7.62		9.20		10.89		14.81		19.18	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	12.5	+3	17.5	+0.25	20	2.25	21.5	3.75	21.5	3.75	20.75	3	23.25	5.5
Ambridge, Pa. N2	12.5	...	17.5	...	20	...	21.5	...	21.5	...	20.75	...	23.25	...
Lorain, O. N3	12.5	+3	17.5	+0.25	20	2.25	21.5	3.75	21.5	3.75	20.75	3	23.25	5.5
Youngstown Y1	12.5	+3	17.5	+0.25	20	2.25	21.5	3.75	21.5	3.75	20.75	3	23.25	5.5

ELECTRIC WELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Youngstown R3	12.5	+3	17.5	+0.25	20	2.25	21.5	3.75	21.5	3.75	20.75	3	23.25	5.5

BUTTWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	⅛		¼		⅜		½		¾		1		1¼	
List Per Ft	5.5c		6c		6c		8.5c		11.5c		17c		23c	
Pounds Per Ft	0.24		0.42		0.57		0.85		1.13		1.68		2.28	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	...	...	....	....	....	....	23.75	6.5	26.75	10.5	29.25	14	31.75	15.25
Alton, Ill. L1	...	...	....	....	....	....	21.75	4.5	24.75	8.5	27.25	12	29.75	13.25
Benwood, W. Va. W10	24	+4.5	16.25	+10.25	7.25	+17.25	23.75	6.5	26.75	10.5	29.25	14	31.75	15.25
Butler, Pa. F6	25	+3.5	17	+8.5	9.5	+15	....	..	....	...	....	..	....	....
Etna, Pa. N3	...	...	....	....	....	....	23.75	6.5	26.75	10.5	29.25	14	31.75	15.25
Fairless, Pa. N3	...	...	....	....	....	....	21.75	4.5	24.75	8.5	27.25	12	29.75	13.25
Fontana, Calif. K1	...	...	....	....	....	....	10.75	+6.5	13.75	+2.5	16.25	1	18.75	2.25
Ind. Harbor, Ind. Y1	...	...	....	....	....	....	22.75	5.5	25.75	9.5	28.25	13	30.75	14.25
Lorain, O. N3	...	...	....	....	....	....	23.75	6.5	26.75	10.5	29.25	14	31.75	15.25
Sharon, Pa. S4	25	+3.5	17	+8.5	9.5	+15	....	..	....	...	....	..	....	....
Sharon, Pa. M6	...	...	....	....	....	....	23.75	6.5	26.75	10.5	29.25	14	31.75	15.25
Sparrows Pt., Md. B2	23	+5.5	15	+10.5	7.5	+17	21.75	4.5	24.75	8.5	27.25	12	29.75	13.25
Youngstown R3, Y1	...	...	....	....	....	....	23.75	6.5	26.75	10.5	29.25	14	31.75	15.25
Wheatland, Pa. W9	23	+5.5	15	+10.5	7.5	+17	23.75	6.5	26.75	10.5	29.25	14	31.75	15.25

Size—Inches	1⅛		2		2½		3		3½		4	
List Per Ft	27.5c		37c		58.5c		76.5c		92c		$1.09	
Pounds Per Ft	2.73		3.68		5.82		7.62		9.20		10.89	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	32.25	16.25	32.75	16.75	34.25	17	34.25	17	....	...	....	...
Alton, Ill. L1	30.25	14.25	30.75	14.75	32.25	15	32.25	15	....	...	....	...
Benwood, W. Va. W10	32.25	16.25	32.75	16.75	34.25	17	34.25	17	25.5	7.75	25.5	7.75
Etna, Pa. N3	32.25	16.25	32.75	16.75	34.25	17	34.25	17	25.5	7.75	25.5	7.75
Fairless, Pa. N3	30.25	14.25	30.75	14.75	32.25	15	32.25	15	23.5	5.75	23.5	5.75
Fontana, Calif. K1	19.25	3.25	19.75	3.75	21.25	4	21.25	4	12.5	+5.25	12.5	+5.25
Ind. Harbor, Ind. Y1	31.25	15.25	31.75	15.75	33.25	16	33.25	16	24.5	6.75	25.5	6.75
Lorain, O. N3	32.25	16.25	32.75	16.75	34.25	17	34.25	17	....	...	....	...
Sharon, Pa. M6	32.25	16.25	32.75	16.75	34.25	17	34.25	17	....	...	....	...
Sparrows Pt., Md. B2	30.25	14.25	30.75	14.75	32.25	15	32.25	15	23.5	5.75	23.5	5.75
Youngstown R2, Y1	32.25	16.25	32.75	16.75	34.25	17	34.25	17	25.5	7.75	25.5	7.75
Wheatland, Pa. W9	32.25	16.25	32.75	16.75	34.25	17	34.25	17	25.5	7.75	25.5	7.75

*Galvanized pipe discounts based on current price of zinc (11.50c, East St. Louis).

Stainless Steel

(Representative prices, cents per pound; subject to current lists of extras)

AISI Type	Rerolling Ingots	Rerolling Slabs, Billets	Forging Billets	Seamless Tube Billets	Shapes: H.R. & C.F. H.R. Strip	Shapes: H.R. & C.F. Bars; Wire	Plates	Sheets	C.R. Strip; Flat Wire
301	16.75	21.00	30.00	34.75	30.25	35.75	37.75	41.75	38.75
302	17.75	23.25	30.25	35.00	32.50	36.00	38.00	42.00	42.00
302B	19.00	25.00	31.00	35.00	35.50	36.00	38.00	45.25	45.25
303	....	25.25	32.75	37.75	....	38.75	40.25	46.00	46.00
304	19.00	24.50	31.75	36.75	35.00	38.00	40.50	44.50	44.50
304L	....	....	36.75	41.75	40.00	43.00	45.50	49.50	49.50
305	20.50	26.50	33.50	37.25	36.00	38.00	41.00	47.50	47.50
308	20.75	27.25	36.25	41.75	39.00	42.00	47.00	49.00	49.00
309	27.75	36.00	44.00	50.50	50.50	51.75	55.00	63.25	63.25
309S	29.75	38.75	48.00	55.75	55.25	56.75	60.25	69.75	69.75
310	35.60	45.25	58.75	66.25	64.75	69.50	71.00	74.25	74.25
314	....	....	....	....	....	....	71.00	....	....
316	29.75	38.00	48.25	56.25	55.00	57.25	60.50	64.50	64.50
316L	....	....	53.25	61.25	60.00	62.25	65.50	69.50	69.50
317	35.00	45.50	59.25	68.75	69.50	70.25	72.75	79.00	79.00
321	23.50	30.25	36.00	41.50	41.75	42.75	46.50	51.25	51.25
330	....	....	61.50	....	....	72.00	73.25	81.25	81.25
18-8CbTa	29.25	38.25	46.00	52.25	53.00	53.75	58.50	66.50	66.50
403	....	....	27.00	30.75	....	32.00	34.25	....	....
405	16.50	21.75	25.25	29.25	30.50	30.25	31.75	39.75	39.75
410	14.00	18.25	24.00	27.25	26.25	28.75	30.00	34.25	34.25
414	....	....	24.50	....	....	29.25	30.50	35.25	35.25
416	....	....	24.50	28.25	....	29.25	....	....	....
420	22.00	28.50	29.25	34.00	35.50	35.00	35.50	52.75	52.75
430	14.75	18.50	24.50	28.25	27.00	29.25	30.50	34.75	34.75
430F	....	....	25.00	28.75	....	29.75	....	....	....
431	15.00	19.25	25.00	28.75	28.00	29.75	31.00	35.75	35.75
446	....	....	33.50	38.25	50.25	39.50	40.75	59.75	59.75

Stainless Steel Producers Are: Allegheny Ludlum Steel Corp.; Alloy Metal Wire Co. Inc.; American Steel & Wire Div., U. S. Steel Corp.; Armco Steel Corp.; Babcock & Wilcox Co.; Bethlehem Steel Co.; J. Bishop & Co.; G. O. Carlson Inc.; Carpenter Steel Co.; Charter Wire Products Co.; Cold Metal Products Co.; Crucible Steel Co. of America; Damascus Tube Co.; Wilbur B. Driver Co.; Driver-Harris Co.; Eastern Stainless Steel Corp.; Ellwood Ivins Steel Tube Works Inc.; Firth Sterling Inc.; Ft. Wayne Metals Inc.; Globe Steel Tubes Co.; Helical Tube Co.; Indiana Steel & Wire Co.; Ingersoll Steel Div., Borg-Warner Corp.; Jessop Steel Co.; Johnson Steel & Wire Co. Inc.; Joslyn Mfg. & Supply Co.; Kenmore Metals Corp.; Maryland Fine & Specialty Wire Co.; McLouth Steel Corp.; Metal Forming Corp.; McInnes Steel Co.; National-Standard Co.; National Tube Div., U. S. Steel Corp.; Newman-Crosby Steel Co.; Pacific Tube Co.; Page Steel & Wire Div., American Chain & Cable Co. Inc.; Pittsburgh Rolling Mills Inc.; Republic Steel Corp.; Rodney Metals Inc.; Rome Mfg. Co.; Rotary Electric Steel Co.; Sharon Steel Corp.; Sawhill Tubular Products Inc.; Simonds Saw & Steel Co.; Specialty Wire Co. Inc.; Spencer Wire Corp.; Stainless Welded Products Inc.; Standard Tube Co.; Superior Steel Corp.; Superior Tube Co.; Timken Roller Bearing Co.; Trent Tube Co.; Tube Methods Inc.; Ulbrich Stainless Steels; United States Steel Corp.; Universal-Cyclops Steel Co.; Wallingford Steel Co.; Washington Steel Corp.

Clad Steel

	Plates: Carbon Base 10%	Plates: Carbon Base 20%	Sheets Carbon Base 20%
Stainless:			
302	....	....	28.00
304	27.60–28.30	32.70–33.60	29.75
304-L	30.30	35.50	....
316	32.60–33.40	37.70–38.80	42.75
316-L	37.80	43.30	....
316-CB	38.90	45.50	....
321	29.30–30.00	34.40–35.30	34.25
347	30.40–32.20	38.60	44.25
405	23.40–23.90	30.60–31.10	....
410	22.90–23.40	30.10–30.60	....
430	23.40	30.60	24.25
Inconel	47.90	63.90	....
Nickel	39.50	54.10	....
Monel	40.80	54.80	....
L-Nickel	41.70	58.50	....
Copper*	....	....	46.00

	Strip, Carbon Base: Cold-Rolled 10%	Cold-Rolled Both Sides	Hot-Rolled 10%	Hot-Rolled Both Sides
Copper*	28.85	35.85	25.00	32.25

* Deoxidized. Production points: Stainless-clad sheets, New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. C22, Coatesville, Pa. L7, New Castle, Ind. I-4 and Washington, Pa. J3; nickel, inconel, monel-clad plates, Coatesville L7; copper-clad strip, Carnegie, Pa. S18.

Tool Steel

Grade	$ per lb	Grade	$ per lb
Regular Carbon	0.26	5% Cr Hot Work	0.405
Extra Carbon	0.31-.315	W-Cr Hot Work	0.425
Special Carbon	0.37	V-Cr Hot Work	0.445
Oil Hardening	0.405	Hi-Carbon-Cr	0.73

Grade by Analysis (%)

W	Cr	V	Co	Mo		$ per lb
20.25	4.25	1.6	12.25	...		4.030
18.25	4.25	1	4.75	...		2.245-2.415
18	4	2	9	...		2.615
18	4	2	....	...		1.705
18	4	1	....	...		1.540
14	4	2	5	...		2.185
13.75	3.75	2	5	...		2.185
13.5	4	3	....	...		1.805
9	3.5	..	....	...		1.115
6	4	2	....	5		1.045
6	4	3	....	6		1.290
1.5	4	1	....	8.5		0.900

Tool steel producers include: A4, A8, B2, B8, C4, C9, C13, C18, D4, F2, J3, L3, M14, S6, U4, V2 and V3.

Pig Iron

F.o.b. furnace prices in dollars per gross ton, as reported to STEEL. Minimum delivered prices are approximate and do not include 3% federal tax.

	Basic	No. 2 Foundry	Malleable	Bessemer
Birmingham District				
AlabamaCity,Ala. R2	53.38	52.88	....	....
Birmingham R2	53.38	52.88	....	....
Birmingham U6	....	52.88	56.50†	....
Gadsden,Ala. R2	52.38	52.88	....	....
Cincinnati, deld.	....	60.58	....	....
Buffalo District				
Buffalo H1, R2	56.00	56.50	57.00	57.50
Tonawanda,N.Y. W12	56.00	56.50	57.00	....
No.Tonawanda,N.Y. T9	....	56.50	57.00	57.50
Boston, deld.	66.65	67.15	67.65	....
Rochester, N.Y., deld.	59.02	59.52	60.02	....
Syracuse,N.Y., deld.	60.12	60.62	61.12	....
Chicago District				
Chicago I-3	56.00	56.50	56.50	57.00
Chicago R2	56.00	....	56.50	....
Gary,Ind. U5	56.00	....	56.50	....
IndianaHarbor,Ind. I-2	56.00	....	56.50	....
So.Chicago,Ill. W14, Y1	56.00	56.50	56.50	....
So.Chicago,Ill. U5	56.00	....	56.50	57.00
Milwaukee, deld.	58.17	58.67	58.67	59.17
MuskegonMich., deld.	....	62.50	62.50	....
Cleveland District				
Cleveland A7, R2	56.00	56.50	56.50	57.00
Akron,O., deld.	58.75	59.25	59.25	59.75
Lorain,O. N3	56.00	....	....	57.00
Mid-Atlantic District				
Bethlehem,Pa. B2	58.00	58.50	59.00	59.50
New York, deld.	....	62.28	62.78	....
Newark, deld.	61.02	61.52	62.02	62.52
Birdsboro,Pa. B10	56.00	56.50	....	....
Chester,Pa. C31	....	48.50	49.00	....
Philadelphia, deld.	....	50.16	50.66	....
Steelton,Pa. B2	58.00	58.50	59.00	59.50
Swedeland,Pa. A3	58.00	58.50	59.00	59.50
Philadelphia, deld.	59.66	60.16	60.66	61.16
Troy,N.Y. R2	58.00	58.50	59.00	59.50
Pittsburgh District				
Neville Island,Pa. P6	56.00	56.50	56.50	57.00
Pittsburgh (N&S sides), Aliquippa, deld.	....	57.87	57.87	58.37
McKeesRocks, deld.	....	57.54	57.54	58.04
Lawrenceville,Homestead, Wilmerding,Monaca, deld.	....	58.16	58.16	58.66
Verona,Trafford, deld.	58.19	58.69	58.69	59.19
Brackenridge, deld.	58.45	58.95	58.95	59.45
Bessemer,Pa. U5	56.00	....	56.50	57.00
Clairton,Rankin,So.Duquesne,Pa. U5	56.00	....	....	....
McKeesport,Pa. N3	56.00	....	....	57.00
Midland,Pa. C18	56.00	....	....	....

	Basic	No. 2 Foundry	Malleable	Bessemer
Youngstown District				
Hubbard,O. Y1	....	....	56.50	....
Sharpsville,Pa. S6	56.00	56.50	56.50	57.00
Youngstown Y1	....	....	56.50	57.00
Youngstown U5	56.00	....	....	57.00
Mansfield,O. deld.	60.90	....	61.40	61.90
Duluth I-3	56.00	56.50	56.50	57.00
Erie,Pa. I-3	56.00	56.50	56.50	57.00
Everett,Mass. E1	60.50	61.00	61.50	....
Fontana,Calif. K1	62.00	62.50	....	....
Geneva,Utah C11	56.00	56.50	....	....
GraniteCity,Ill. G4	57.90	58.40	58.90	....
Ironton,Utah C11	56.00	56.50	....	....
LoneStar, Texas L6	52.00	52.50*	52.50	....
Minnequa,Colo. C10	58.00	59.00	59.00	....
Rockwood,Tenn. T2	....	52.50*	56.50	....
Toledo,O. I-3	56.00	56.50	56.50	57.00
Cincinnati, deld.	61.76	62.26	....	....

*Low phos, southern grade. †Phos., 0.30 max.

PIG IRON DIFFERENTIALS

Silicon: Add 50 cents per ton for each 0.25% Si or percentage thereof over base grade, 1.75-2.25%, except on low phos iron on which base is 1.75-2.00%.

Phosphorus: Deduct 38 cents per ton for P content of 0.70% and over.

Manganese: Add 50 cents per ton for each 0.50% manganese over 1% or portion thereof.

Nickel: Under 0.50% no extra; 0.50-0.74%, incl., add $2 per ton and each additional 0.25%, add $1 per ton.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.0-6.50% silicon; add $1.00 for each 0.5% Si; 75 cents for each 0.5% Mn over 1%)

Jackson,O. G2, J1	$85.50
Buffalo H1	88.38

ELECTRIC FURNACE SILVERY PIG IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1 for each 0.5% Mn over 1%; $2 per gross ton premium for 0.045% max P)

NiagaraFalls,N.Y. P15	$80.50
Keokuk,Iowa, Openhearth & Fdry, freight allowed K2	82.00
Keokuk, OH & Fdry, 12½ lb pigiets, 16% Si, frgt allowed K2	85.00

LOW PHOSPHORUS PIG IRON, Gross Ton

Cleveland, Intermediate A7	$81.00
Lyle,Tenn. T3	70.00
Rockwood,Tenn. T3	70.00
Steelton,Pa. B2	84.00
Philadelphia, deld.	87.55
Troy,N.Y. R2	84.00

Warehouse Steel Products

Representative prices, cents per pound, subject to extras, f.o.b. warehouse. City delivery charges are 20 cents per 100 lb except Birmingham and St. Paul, 15 cents; Philadelphia, New York, Boston and Los Angeles, 10 cents; Buffalo, 25 cents on C.R. and galvanized sheets, C.F. and alloy bars and 20 cents on other commodities; Houston, Seattle, Spokane, Wash., no charge.

	SHEETS				STRIP		BARS			Standard Structural Shapes	PLATES	
	Hot Rolled	Cold Rolled	Gal. 10 Ga.†	Stainless Type 302‡§	H.R.*	C.R.*	H.R. Rds.	C.F. Rds.‖	H.R. Alloy 4140‡‡*		Carbon	Floor
Baltimore	6.02	7.51	7.79	....	6.69	...	6.68	8.52*	12.04	6.72	6.37	7.76
Birmingham	6.35	7.35	8.25*	....	6.60	...	6.50	9.10	....	6.65	6.65	8.45
Boston	7.23	8.23	9.52	45.28*	7.47	...	7.20	8.60	12.45	7.49	7.37	8.50
Buffalo	6.35	7.40	8.79	....	6.70	...	6.50	7.85	12.15	6.72	6.65	7.90
Charlotte, N. C.	6.95	7.80	8.69	....	6.90	...	7.10	8.37	....	7.10	7.10	8.37
Chicago	6.38	7.38	8.30	46.05	6.62	...	6.51	7.50	11.90	6.69	6.52	7.64
Cincinnati	6.49	7.37	8.30	45.80	6.86	...	6.75	7.80	12.15	6.86	6.81	7.89
Cleveland	6.38	7.38	8.45	45.66	6.72	...	6.57	7.60	11.96	7.02	6.69	7.81
Detroit	6.57	7.57	8.58	43.50	6.90	7.36	6.79	7.79	12.10	7.16	6.80	7.83
Erie, Pa.	6.35	7.38	8.30	....	6.70	...	6.50	7.45*	....	6.69	6.52	7.64
Houston	7.35	7.80	9.93	....	7.70	9.30	7.70	9.50	....	7.60	7.35	8.75
Los Angeles	7.50	9.35	9.95	50.15	7.85	11.75	7.45	10.15	13.20	7.65	7.45	9.55
Milwaukee	6.47	7.47	8.39	...	6.71	...	6.60	7.69	11.99	6.86	6.61	7.73
Moline, Ill.	6.73	7.73	8.65	....	6.97	...	6.86	7.85	....	7.04	6.87	....
New York	6.97	7.91	8.79	44.95	7.56	...	7.37	8.73*	12.28	7.38	7.27	8.68
Norfolk, Va.	7.00	....	....	....	7.10	...	7.10	8.60	....	7.10	7.10	7.95
Philadelphia	6.19	7.44	8.26	41.98*	6.96	8.80	6.74	8.36*	12.10	6.54	6.49	7.51**
Pittsburgh	6.38	7.38	8.30	46.00	6.72	...	6.51	7.85	11.90	6.69	6.52	7.64
Portland, Oreg.	7.60	8.75	9.35	48.80	7.85	...	7.55	10.95	14.00	7.50	7.45	9.35
Richmond, Va.	6.43	7.39	8.67	....	6.77	...	6.71	8.33	....	7.08	6.65	8.08
St. Louis	6.67	7.67	8.59	43.89	6.91	...	6.80	7.89	12.19	7.09	6.81	7.93
St. Paul	7.04	8.04	8.96	....	7.28	...	7.17	8.26	....	7.35	7.18	8.30
San Francisco	7.55	8.95	8.70	51.65	7.80	...	7.35	10.05	13.20	7.50	7.40	9.45
Seattle	8.10	9.80	10.15	51.00	8.20	...	7.80	10.95	13.65	7.75	7.80	9.60
Spokane	8.35	9.85†	10.05	....	7.80	...	7.80	10.85‖‖	14.40	7.45	7.55	9.60
Washington	6.70	7.99	7.97	....	7.37	...	7.38	9.09	....	7.31	7.05	8.14

*Prices do not include gage extras; †prices include gage and coating extras, based on 11-cent zinc except in New York, Philadelphia, Los Angeles, Cincinnati, Cleveland, Pittsburgh, San Francisco (11.50-cent zinc) and in Birmingham (coating extra excluded); ‡includes 35-cent special bar quality extra; §as rolled; **¼-in. and heavier; ††as annealed; ‡‡prices include $2 for crating; §§under ½-in.

Base quantities, 2000 to 4999 lb except as noted: Cold-rolled strip and cold-finished bars, 2000 lb and over, except in Seattle, 2000 to 9999 lb; stainless sheets, 8000 lb except in New York and Boston, 10,000 lb, and in San Francisco, 2000 to 4999 lb; hot-rolled products on West Coast, 2000 to 9999; ‖—500 to 9999 lb; *—4000 lb and over; ‖—1000 to 1999 lb; ¶—1000 lb and over; †—1500 lb to 3999 lb; ‖—f.o.b. local delivery in lots of 10,000 lb and over.

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WAGNER LITHO MACHINERY	*Jersey City, N. J.*	Metal Decorating Equipment
WORCESTER WIRE WORKS	*Worcester, Mass.*	Round and Shaped Steel Wire, Small Sizes

Alloy and Stainless Steel Use by States

Per Cent of U. S. Total—First Half, 1952

Mich.	19.69	Okla.	0.40	Ala.	0.04
Ohio	18.76	Oreg.	0.33	Nebr.	0.04
Ill.	10.60	Md.	0.31	N. H.	0.04
Ind.	10.31	Wash.	0.31	Del.	0.03
Pa.	9.26	Minn.	0.26	Fla.	0.01
Wis.	5.60	Colo.	0.22	Miss.	0.01
N. Y.	5.47	R. I.	0.14	N. C.	0.01
Tex.	3.55	Utah	0.11	S. C.	0.01
Conn.	3.19	La.	0.10	Ark.	*
Calif.	3.12	Vt.	0.10	D. C.	*
Mass.	2.46	Ariz.	0.08	Idaho	*
N. J.	2.45	Kans.	0.08	Mont.	*
W. Va.	1.00	Va.	0.08	Nev.	*
Mo.	0.78	Me.	0.07	N. Mex.	*
Ky.	0.43	Tenn.	0.07	N. Dak.	*
Iowa	0.42	Ga.	0.06	S. Dak.	*
				Wyo.	*

* Some used, but very little.
U. S. Bureau of the Census

Alloy and Stainless Steel: Where the Users Are

THE GEOGRAPHICAL consumption of alloy and stainless steels is not a carbon copy of carbon steel.

In none of the nine regions of the United States does usage of alloy and stainless steel exactly parallel carbon steel consumption.

Something in Common—Among the few things the two kinds of steel have in common are: The East North Central region is the largest consumer; the Middle Atlantic region is the second largest; the Pacific region is in fifth place; the Mountain region is the smallest; and Michigan and Ohio rank first and second, respectively, among the states.

But even among those resemblances there are differences: The East North Central region uses 64.96 per cent of all of the alloy and stainless steel consumed in the nation, compared with 53.77 per cent for carbon steel. In contrast, the Middle Atlantic region uses a smaller percentage of alloy and stainless than carbon steel. Its share of alloy and stainless is 17.18 per cent, but carbon steel totals 21.79 per cent.

The New England region, which is eighth in usage of carbon steel, is the third largest consumer of alloy and stainless steel.

Variations—While Michigan and Ohio hold first and second places in consumption of carbon steel and alloy and stainless steel, they use a higher percentage of alloy and stainless than they do carbon. Michigan uses 15.19 per cent of the carbon steel but 19.69 per cent of the alloy and stainless. Ohio consumes 14.76 per cent of the carbon steel, but it takes 18.76 per cent of the alloy and stainless steel. To make further comparisons of the states, see the table above and the one on p. 125 of the Jan. 17 issue.

Contrasts between the regions are shown in the following table:

Per Cent of U. S. Usage

Region	Carbon Steel	Alloy, Stainless Steel
E. North Central	53.77	64.96
Middle Atlantic	21.79	17.18
W. North Central	4.92	1.58
South Atlantic	4.86	1.51
Pacific	4.69	3.76
W. South Central	3.86	4.05
E. South Central	2.84	0.55
New England	2.74	6.00
Mountain	0.53	0.41
Total	100.00	100.00

The Source—The ranking of the states and regions is revealed in the

Here is the second of four articles on the geographic location of consumers of metals. It covers alloy and stainless steel mill shapes and castings. The next two articles will be on copper and copper-base alloys and aluminum. The first article appeared on p. 125 of last week's issue and covered carbon steel. For reprints of these articles write to the Editorial Department, STEEL, Penton Bldg., Cleveland 13, O.

U. S. Census Bureau's "Facts for Industry, series NPAF-1-02." It is based on 1952 and is the first geographic report on steel usage since the 1947 "Census of Manufactures," issued at the end of 1949. The report is based on consumption of metals in five major industry groups: Fabricated metal products, machinery (except electrical), electrical machinery, transportation equipment, and iron and steel forgings.

The Leaders—In most cases, bars and bar shapes are the leading alloy and stainless product consumed in the various regions. That is true for the New England, Middle Atlantic, East North Central, West South Central and Pacific regions. In the West North Central region, sheet and strip are the leading alloy and stainless product consumed, while in the South Atlantic region it's pipe and tubing. Usage of alloy and stainless in the East South Central and Mountain regions is so small the government report does not give a breakdown of products.

The leading region in consumption in each of the seven product classifications of alloy and stainless in the report is East North Central. That holds true for castings as well as mill shapes. The East North Central region (Ohio, Indiana, Illinois, Michigan and Wisconsin) uses 51 per cent of the alloy and stainless steel castings consumed in the nation.

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Sheets, Strip . . .

Sheet & Strip Prices, Pages 107 & 108

The supply pinch in cold-rolled sheets is beginning to hurt. Practically all producers are committed well into the second quarter. Some mills are unable to accept additional tonnage through the first half, either because they are booked full or have completely allotted tonnage to their various sales offices to assure regular customers' needs will be filled.

Consumers needing additional tonnage are finding it necessary to seek out new sources. For example, inquiry is coming into Cleveland and other eastern producing points from the Chicago area where the mills are booked solid. Still, reports of a revival of gray market operations lack confirmation, with warehouse tonnage readily available.

The same story comes from virtually all market centers. Cleveland sellers are virtually booked full on cold-rolled and are sold into April on hot-rolled; they are well into the second quarter on the lighter gages of enameling sheets, with the heavier gages in relatively easy supply; silicon sheet deliveries extend into May, but hot-dipped galvanized sheets are available for March shipment. Republic Steel Corp.'s new continuous galvanizing line is scheduled to come into production in April.

Sheetmakers at Chicago still can deliver hot-rolled sheets and strip in three to four weeks, sometimes less. But cold-rolled, galvanized and enameling sheets are either sold out for the first half or are close to that status. St. Louis mills are booked up into second quarter on cold-rolled.

In the East the market does not appear to be in quite as strong position on cold-rolled sheets as in the Midwest. April shipments still are offered by producers in that area. On the other hand, there is a tighter galvanized sheet situation in the district than elsewhere, one eastern mill now quoting July delivery on continuous hot-dipped, compared with late April by some inland makers. Hot-rolled sheets can be had in four to five weeks.

New England consumers are finding it increasingly difficult to buy wide coils for slitting, 40 in. or thereabout. In increasing number, buyers must accept narrower widths, paying the width extras. Some users in the area have not bought cold-rolled for the second quarter, but many have April-June orders in. As a result, some leveling off in demand may not

Each COR-TEN Steel container is equipped with air intake and air relief valves, and receptacles containing a desicant, which dehumidifies the trapped pressurized air to the low relative humidity that will prevent corrosion or fungus attack to the contents.

How USS COR-TEN Steel containers for military aircraft engines help save U. S. Government millions of dollars yearly

DURING the past ten years the U. S. Department of Defense has developed a new concept in the field of packaging that has vitally strengthened our military preparedness.

It consists of the use of pressurized, shock-proof steel containers for the vibration-isolated shipping, handling and storage of aircraft engines, both reciprocating and jet types.

Because these containers must be stored in air bases all over the world and are frequently transported by air, basic design requirements call for lightness coupled with high strength and corrosion resistance.

In USS COR-TEN Steel, the Baltimore Steel Company, Baltimore, Md., a producer of such containers, has found the most satisfactory material and the most economical from the cost standpoint.

By replacing carbon steel with USS COR-TEN Steel, which is 50% stronger, weight has been reduced appreciably—with no loss of container strength and at a cost comparable to mild steel. The result—a lighter, stronger finished product that has the added benefit of higher atmospheric corrosion resistance—4 to 6 times that of carbon steel. Thus the engines, shipped undamaged in these COR-TEN Steel containers, *stay* factory-new and instantly available, regardless of temperature, climate or length of storage. What's more, experience has shown that COR-TEN Steel containers are re-useable again and again with a minimum of maintenance.

As to the savings they assure, note this: The U. S. Navy reports that over a 5-month period in 1947, the loss due to corrosion and damage of engines in ordinary non-metal containers was $4,750,000. But in 1952, over a similar 5-month period, for the same number of engines in steel containers, such loss was reduced to a mere $1,750.

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USS COR-TEN HIGH Strength STEEL

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UNITED STATES STEEL

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WELD WITH ARCOS

STAINLESS WIRE AND ARCOSITE FLUX

be too far off. Enameling sheet orders are heavier and more extended than anticipated. The annealing cycle is a limiting factor in the case of several producers. Electro-coated sheets are sold out through second quarter in some instances.

Bookings of some New England contract stamping shops have improved slightly, but most could handle more volume. Those supplying automotive parts have the largest backlogs.

Sheet production in the Cincinnati area is at the highest level in about a year.

Pittsburgh mills can give cold-rolled deliveries no earlier than late April or early May. Most district sheet capacity is geared to requirements of the automakers, but demand from other consuming outlets is rising.

Increasing quantities of German hot-rolled sheets are a disturbing influence in the West Coast market.

U. S. Steel Corp. plans to install a second strip coiler at its McDonald Mills at Youngstown.

Florence Stove Division, Gardner, Mass., is moving to Tennessee. This will adversely affect demand for stainless and enameling sheets in the New England market.

Tin Plate . . .

Tin Plate Prices, Page 168

Tin mills in the Pittsburgh district are operating at near-capacity rates, building stocks in anticipation of an increasing flow of orders. Mill books are well filled for the current quarter.

Export sales of tin plate continue substantial with the outlook for the year considered favorable. The trend is continually toward a less seasonal aspect to this market, although the second and third quarters are expected to be the best in sales this year, as usual.

Beer-can production hit an all-time high of nearly 6.5 billion units in 1954, according to William C. Stolk, president, American Can Co. This record, he says, dramatizes the tremendous growth in popularity of canned beer the last 20 years. Since January, 1935, when American Can introduced the first beer can, the entire industry has produced a total of 42-billion cans for beer and ale.

Packaged beer represents 77 per cent of all beer sold and canned beer makes up 33 per cent of this total.

Quickening demand from canmakers for tin plate is resulting in some lengthening of deliveries in the Chicago area. The pickup is attributed to seasonal influences. However, one district mill indicates incoming orders must be scheduled for March shipment.

Steel Bars . . .

Bar Prices, Page 106

Bar business is moderately active, but it is still far from brisk, with sellers driving hard for new tonnage orders.

Actually, the improvement in sales experienced over the past three months has leveled off at a point below expectations, notably in the Pittsburgh district.

Demand is fairly well diversified, coming from a variety of consuming outlets. Except for auto builders, no single customer appears buying in large volume. Bolt and nut makers' requirements in the East appear to be most prominent.

Deliveries average around three weeks on the hot-rolled carbon grades. On cold-drawn there is a spread of anywhere from prompt shipment to eight weeks, depending upon size and, more importantly, on what the finishers have in stock. Hot-rolled alloy bars can be had for shipment within two to four weeks while cold-finished alloy deliveries average around five weeks.

Annual capacity of the projected bar mill, Northeastern Steel Corp., Bridgeport, Conn., will be rated at 160,000 tons. Small sizes will be rolled, 1 to ⅜-in. predominating. Estimated product tonnage, operating at 100 per cent, looks like this: Hot-rolled carbon bars, including bar shapes, down to ¼ in. for flats and ⅜-in. rounds, 84,000 tons; hot-rolled alloy bars, down to ¼-in. and ⅜-in., 60,000 tons; cold-drawn carbon bars down to ¾-in., 6000 tons. The billet mill will be rebuilt to produce rounds up to 8 in. diameter.

Plates . . .

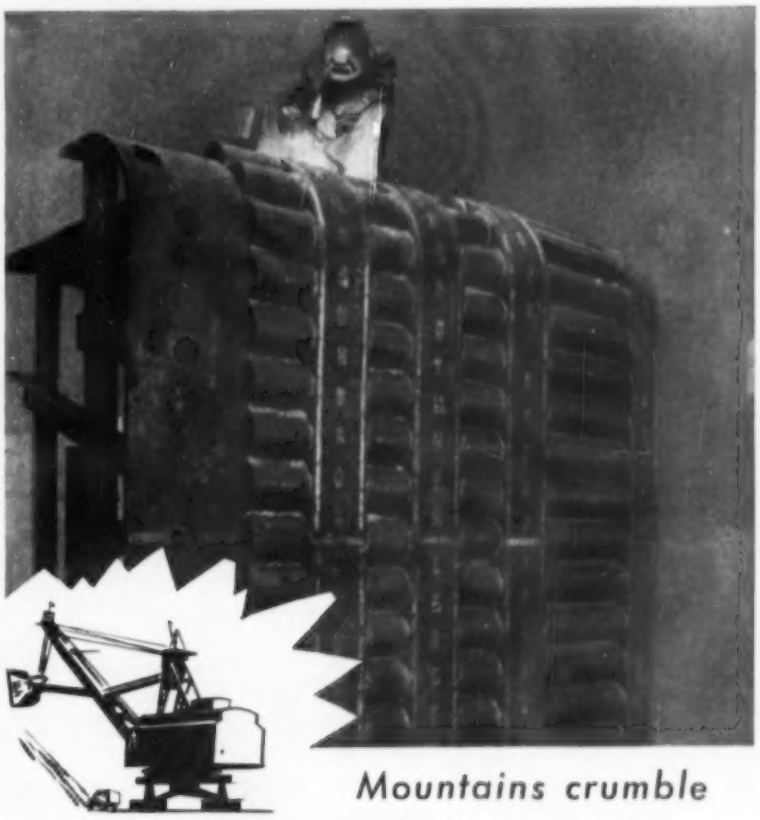
Plate Prices, Page 106

The slight pickup in plate sales is fairly general, but demand continues far below mill capacity, with prompt shipments serving to encourage spot buying by consumers. Floor plates appear to be moving better than the plain carbon grade; inquiry for wrought iron plates for bridges is reported heavier.

In the East the margin of improvement in order volume is so slight it is scarcely discernible. At Pittsburgh and market points west, after a noticeable gain in sales, demand appears to have become spotty again.

Tank and boiler shops are more or less coasting along. Shipwork is flat in the East and there is not much in the way of railroad volume, though prospects for a pickup in this area of consumption are thought somewhat better. On the West Coast, petroleum refinery activity is being reflected

ARCOS FOR FINEST QUALITY WELDS



Mountains crumble as **welded** jaws bite in

Modern power shovels gulp truckloads of rock and dirt at one bite. It's a good example of how *welded* high tensile steels make possible bigger payloads—provide extra strength and toughness to reduce maintenance.

An important factor in this achievement is the quality of weld metal. That's why so many fabricators today specify Arcos Low Hydrogen Electrodes when welding low alloy high tensile steels. *On any job* demanding shock and abrasion resistance . . . maximum strength and ductility, the excellent properties of Arcos weld metal assures the results you want in service. Arcos offers quality weld metal and technical assistance that is second to none. Arcos Corporation, 1500 South 50th Street, Philadelphia 43, Pa.

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Current Ferroalloy Quotations

MANGANESE ALLOYS

Spiegeleisen: (19-21% Mn, 1-3% Si). Carlot per gross ton $56, Palmerton, Pa.; $57 Clairton and Duquesne, Pa.
(16 to 19% Mn) $54 per ton, Palmerton, Pa.; $55 per ton, Clairton and Duquesne, Pa.

Standard Ferromanganese: (Mn 74-76%, C 7% approx.). Base price per net ton $190, Clairton, Duquesne, Johnstown and Sheridan, Pa.; Alloy, W. Va.; Ashtabula, Marietta, Philo, O.; Sheffield, Ala.; Portland, Oreg., and Tacoma, Wash. Add or subtract $2.00 for each 1% or fraction thereof of contained manganese over 76% or under 74%, respectively.

(Mn 79-81%) Lump $196 per net ton, f.o.b. Anaconda or Great Falls, Mont. Add $2.60 for each 1% above 81%; subtract $2.60 for each 1% below 76%, fractions in proportion to nearest 0.1%.

Low-Carbon Ferromanganese, Regular Grade: (Mn 85-90%). Carload, lump, bulk, max. 0.07% C, 29.99c per lb of contained Mn, carload packed 30.7c, ton lots 31.8c, less ton 33c. Delivered. Deduct 1.5c for max 0.15% C grade from above prices, 3c for max, 0.30% C, 3.5c for max 0.50% C, and 6.5c for max 75% C—max 7% Si. **Special Grade:** (Mn 90% min, C 0.07% max, P 0.06% max). Add 2.05c to the above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.5% max). Carload, lump, bulk 21.35c per lb of contained Mn, carload packed 22.1c, ton lot 23.2c, less ton 24.4c. Delivered. Spot, add 0.25c.

Manganese Metal: 2" x D (Mn 95.5% min, Fe 2% max, Si 1% max, C 0.2% max): Carload, lump, bulk, 45c per lb of metal; packed, 46.75c; ton lot 47.25c; less ton lots 49.25c. Delivered. Spot, add 2c.

Electrolytic Manganese Metal: Min carloads, 30c; 2000 lb to min carloads, 32c; 250 lb to 1999 lb 34c. Premium for hydrogen-removed metal, 0.75c per lb. Prices are f.o.b. cars, Knoxville, Tenn., freight allowed to St. Louis or to any point east of Mississippi; or f.o.b. Marietta, O., freight allowed.

Silicomanganese: (Mn 65-85%). Contract, lump, bulk, 1.50% C grade, 18-20% Si, 11.00c per lb of alloy, carload packed, 11.75c, ton lots 12.65c, less ton 13.65c. Freight allowed. For 2% C grade, Si 15-17%, deduct 0.2c from above prices. For 3% C grade, Si 12-14.5%, deduct 0.4c from above prices. Spot, add 0.25c

TITANIUM ALLOYS

Ferrotitanium, Low-Carbon: (Ti 20-25%, Al 3.5% max, Si 4% max, C 0.10% max). Contract, ton lots 2" x D, $1.50 per lb of contained Ti; less ton $1.55. (Ti 38-43%, Al 8% max, Si 4% max, C 0.10% max). Ton lots $1.35, less ton $1.37, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis. Spot, add 5c.

Ferrotitanium, High-Carbon: (Ti 15-18%, C 6-8%). Contract $177 per ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi river and north of Baltimore and St. Louis.

Ferrotitanium, Medium-Carbon: (Ti 17-21%, C 2-4.5%). Contract $195 per ton, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

CHROMIUM ALLOYS

High-Carbon Ferrochrome: Contract, c.l., lump, bulk 24.75c per lb of contained Cr; c.l. packed 25.65c, ton lot 26.80c, less ton 28.20c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome: (Cr 67-72%). Contract, carload, lump, bulk, max. 0.025% C (Simplex) 34.50c per lb contained Cr, 0.03% C 36.50c, 0.04% C 35.50c, 0.06% C 34.50c, 0.10% C 34.00c, 0.15% C 33.75c, 0.20% C 33.50c, 0.50% C 33.25c, 1% C 33.00c, 1.50% C 32.85c, 2% C 32.75c. Carload packed add 1.1c, ton lot 2.2c, less ton add 3.9c. Delivered. Spot, add 0.25c.

Foundry Ferrochrome, High-Carbon: (Cr 62-66%, C 5-7%). Contract, c.l. S M x D, bulk, 26.25c per lb contained Cr. Packed, c.l. 27.15c, ton 28.50c, less ton 30.25c. Delivered. Spot, add 0.25c.

Foundry Ferrochrome, Low-Carbon: (Cr 50-54%, Si 28-32%, C 1.25% max). Contract, carload, packed, S M x D, 18.35c per lb of alloy; ton lot 19.2c; less ton lot, 20.4, delivered; spot, add 0.25c.

Low-Carbon Ferrochrome Silicon: (Cr 34-41%, Si 42-49%, C 0.06% max). Contract, carload, lump, 4" x down and 2" x down, bulk, 24.75c per lb of contained chromium plus 12c per pound of contained silicon; 1" x down, bulk 24.90c per pound of contained chromium plus 12.2c per pound of contained silicon. F.o.b. plant; freight allowed to destination.

Chromium Metal: (Min 97% Cr and 1% Fe). Contract, 1" x D; packed, max 0.50%, carload $1.16, ton lots $1.18; less ton $1.20. Delivered. Spot, add 5c. Prices on 0.10 per cent carbon grade, add 9c to above prices.

VANADIUM ALLOYS

Ferrovanadium: Open-hearth Grade (V 35-55%, Si 5-12% max, C 2-3.5% max). Contract, any quantity, $3.00 per lb of contained V. Delivered. Spot, add 10c. **Crucible-Special Grades** (V 50-55%, Si 2-3.5% max, C 0.5-1% max). $3.10. **Primes and High Speed Grades** (V 50-55%, Si 1.50% max, C 0.20% max $3.20.

Grainal: Vanadium Grainal No. 1, $1 per lb; No. 6, 68c; No. 79, 59c, freight allowed.

Vanadium Oxide: Contract, less carload lots $1.28 per lb contained V_2O_5, freight allowed Spot, add 5c.

SILICON ALLOYS

25-30% Ferrosilicon: Contract, carload, lump, bulk, 20.0c per lb of contained Si, packed 21.40c; ton lot 22.50c f.o.b. Niagara Falls, freight not exceeding St. Louis rate allowed.

50% Ferrosilicon: Contract, carload, lump, bulk, 12c per lb of contained Si, carload packed 13.6c, ton lot 15.05c, less ton 16.7c. Delivered. Spot, add 0.45c.

Low-Aluminum 50% Ferrosilicon: (Al 0.40% max). Add 1.7c to 50% ferrosilicon prices.

65% Ferrosilicon: Contract, carload, lump, bulk, 13.5c per pound contained silicon; carload packed 14.85c; ton lots, 16.05c; less ton, 17.4c, delivered. Spot, add 0.35c.

75% Ferrosilicon: Contract, carload, lump, bulk, 14.4c per lb of contained Si, carload packed 15.7c, ton lot 16.85c, less ton 18.1c. Delivered. Spot, add 0.3c.

90% Ferrosilicon: Contract, carload, lump, bulk, 17.25c per lb of contained Si, carload packed 18.45c, ton lot 19.4c, less ton 20.45c. Delivered. Spot, add 0.25c.

Silicon Metal: (Mn 97% Si and 1% max Fe). C.l. lump, bulk, regular 18.5c per lb of Si, c.l. packed 19.7c, ton lot 20.6c, less ton 21.6c. Add 0.5c for max, 0.10% calcium grade. Deduct 0.5c for max 2% Fe grade analyzing min. 96% Si. Spot, add 0.25c.

Alsifer: (Approx. 20% Al, 40% Si, 40% Fe). Contract, basis f.o.b. Niagara Falls, N. Y., lump, carload, bulk, 9.25c per lb of alloy, ton lots packed 10.15c, 200 to 1999 lb 10.50c, smaller lots 11c.

ZIRCONIUM ALLOYS

12-15% Zirconium Alloy: (Zr 12-15%, Si 30-43%, Fe 40-45%, C 0.20% max). Contract, c.l. lump, bulk 8.0c per lb of alloy, c.l. packed 8.75c, ton lot 9.5c, less ton 10.35c. Delivered. Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max). Contract, carload, lump, packed 25.25c per lb of alloy, ton lot 26c, less ton 27.25c. Freight allowed. Spot, add 0.25c.

BORON ALLOYS

Ferroboron: (B 17.50% min, Si 1.50% max, Al 0.50% max, C 0.50% max). Contract, 100 lb or more 1" x D, $1.20 per lb of alloy. Less than 100 lb $1.30. Delivered, spot add 5c. F.o.b. Washington, Pa., prices, 100 lb and over, are as follows: Grade A (10-14% B) 85c per pound; Grade B (14-18% B) $1.20; Grade C (19% min M) $1.50.

Boronil: (3 to 4% B, 40 to 45% Si). $5.25 per lb contained B, delivered to destination.

Bortam: (B 1.5-1.9%). Ton lots, 45c per lb; smaller lots, 50c per lb.

Carbortam: (B 1 to 2%) Contract, lump, carloads 9.50c per lb f.o.b. Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

CALCIUM ALLOYS

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%). Contract, carload, lump, bulk 20.0c per lb of alloy, carload packed 20.8c, ton lot 22.3c, less ton 23.3c. Delivered. Spot, add 0.25c.

Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.50-3%). Contract, carload, lump, bulk 19.0c per lb of alloy, carload packed 20.2c, ton lot 22.1c, less ton 23.6c. Deld. Spot, add 0.25c.

BRIQUETTED ALLOYS

Chromium Briquets: (Weighing approx. 3½ lb each and containing exactly 2 lb of Cr). Contract, carload, bulk, 16.05c per lb of briquet, carload packed 16.95c, ton 17.75c, less ton 18.65c. Deld. Add 0.25c for notching. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx. 3 lb and containing exactly 2 lb of Mn). Contract, carload, bulk 11.85c per lb of briquet, c.l. packaged 12.85c, ton lot 13.65c, less ton 14.55. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx. 3½ lb and containing exactly 2 lb of Mn and approx. ½ lb of Si). Contract, c.l. bulk 12.45c per lb of briquet, c.l. packaged 13.45c, ton lot 14.25c, less ton 15.15c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicon Briquets: (Large size—weighing approx. 5 lb and containing exactly 2 lb of Si). Contract, carload, bulk 6.55c per lb of briquet. Packed c.l. 7.55c, ton lot 8.35c, less ton 9.25c. Delivered. Spot, add 0.25c.

(Small size—Weighing approx. 2½ lb and containing exactly 1 lb of Si). Carload, bulk 6.7c. Packaged c.l. 7.7c, ton lot 8.5c, less ton 9.4c. Delivered. Add 0.25c for notching, small size only. Spot, add 0.25c.

Molybdic-Oxide Briquets: (Containing 2½ lb of Mo each) $1.14 per pound of Mo contained, f.o.b. Langeloth, Pa.

TUNGSTEN ALLOYS

Ferrotungsten: (70-80%), 5000 lb W or more $3.80 per lb of contained W; 2000 lb W to 5000 lb W, $3.90; less than 2000 lb W, $4.02, f.o.b. Niagara Falls, N. Y.

OTHER FERROALLOYS

Ferrocolumbium: (Cb 56-60%, Si 8% max, C 0.4% max). Contract, ton lot, 2" x D, $12 per lb of contained Cb, less ton $12.05. Delivered. Spot, add 10c.

Ferrotantalum—Columbium: (Cb 40% approx., Ta 20% approx., and Cb and Ta 60% min, C 0.30% max) ton lots, 2" x D, $6.25 per lb of contained Cb plus Ta, deld.; less ton lots $6.30.

Silicas Alloy: (Si 35-40%, Ca 9-11%, Al 6-8%, Zr 3-5%, Ti 9-11%, B 0.55-0.75%). Carload packed 1" x D, 45c per lb of alloy, ton lot 47c, less ton 49c. Delivered.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7%, Fe 20% approx). Contract, carload, packed, ¼" x 12 M, 17.5c per lb of alloy, ton lots 18.25c, less ton 19.5c. Deld. Spot, add 0.25c.

Graphidox No. 4: (Si 48-52%, Ca 5-7%, Ti 9-11%). C.l. packed, 17.50c per lb of alloy; ton lots 18.50c; less ton lots 20c, f.o.b. Niagara Falls, N. Y.; freight allowed to St. Louis.

V-S Foundry Alloy: (Cr 38-42%, Si 17-19%, Mn 8-11%). C.l. packed 16.6c per lb of alloy; ton lots 18.10c; less ton lots 19.35c, f.o.b. Niagara Falls; freight allowed to St. Louis.

Siminal: (Approx. 20% each Si, Mn, Al; bal. Fe). Lump, carload, bulk 15.50c. Packed c.l. 16.50c, 2000 lb to c.l. 16.75c, less than 2000 lb 17.25c per lb of alloy. Delivered.

Ferrophosphorus: (23-25% based on 24% P content with unitage of $4 for each 1% of P above or below the base); carloads, f.o.b. sellers' works, Mt. Pleasant, Sigio, Tenn., $90 per gross ton.

Ferromolybdenum: (55-75%). Per lb contained Mo, in 200 lb containers, f.o.b. Langeloth, Pa., $1.46 in all sizes except powdered which is $1.57; Washington, Pa., furnace, any quantity, $1.46.

Technical Molybdic-Oxide: Per lb contained Mo, f.o.b. Langeloth, Pa., $1.25 in cans; in bags, $1.24, f.o.b. Langeloth, Pa.; Washington, Pa., $1.24.

in heavier fabricators' requirements for plates in all sizes.

Pittsburgh sellers expect January sales to better average volume in the fourth quarter of 1954. Expectations, however, are that totals will trail year-ago figures, though general fabricators' consumption is fairly high.

Competition for going business is keen, with most mills offering deliveries within two weeks. One eastern producer can make shipment on some items within a few days.

Lukens Steel Co., Coatesville, Pa., is offering the new "T-1" steel in every commercial plate size.

Structural Shapes . . .

Structural Shape Prices, Page 106

All indications point to a strong year in commercial construction, road and bridge building and other public work, such as schools. Industrial projects are likely to be less active than in recent years, though a substantial number of projects is in the cards.

Currently, requirements for structurals are seasonally slow and steel is readily available. Still, demand is fairly substantial. In the New York area a good volume of work is being placed, including schools, apartments and general commercial and industrial jobs, as well as bridges. Award of more than 3400 tons for state turnpike work at Newark, N. J., features the district market.

Adverse seasonal influences and a switch in political administrations, notably in New York state, may limit volume for a while. However, most fabricating shops hold a comfortable volume of work to tide them over.

Typical of the promising construction outlook at Pittsburgh was the ground breaking for a 16-story office building. Navarro Corp., Pittsburgh, was awarded a $3.8 million contract.

An increasing volume of bridge tonnage is being estimated and initial contracts for fabricated steel for the Massachusetts turnpike are being placed in New England. Except for schools, building requirements in the district are off. Shops are buying plain material close to job needs and are not adding to inventory. More outside New England fabricators with medium capacity are bidding on district bridges. An Elizabeth, N. J., shop booked composite beam spans at West Brook, Conn., involving 850 tons.

Bids are in for a Washington state bascule bridge at Seattle involving 1750 tons. Plans for a large number of projects involving substantial tonnages of shapes are developing in the Pacific Northwest, indicating strong district demand for structurals in the first six months of the year.

Tubular Goods . . .

Tubular Goods Prices, Page 110

Changing needs of oil well drillers are causing increased demand for higher-strength tubing for deep wells and underwater applications.

At the same time Pittsburgh mills report a slight pickup in specialty tubing. Sales have been sluggish in this division of the market. Makers of seamless tubes for pressure applications are running into intensive competition, with utilities expected to buy only small amounts of tubing through the first half of this year. On the other hand, sales of welded tubing are reported in satisfactory volume.

Merchant pipe shipments are heavier in New England. Bookings, however, are not resulting in an extension of deliveries. Buttweld, 4 in. and under, is being shipped from stock in most cases, smaller sizes of seamless in three to four weeks. Orders for merchant steel pipe are up 15 per cent from the 1954 low point.

Distributors' stocks are better balanced, and some are reported placing orders ahead for February and March shipment. This is the first time in

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Lake Superior Iron Ore

(Prices effective July 1, 1953, and thereafter; gross ton, 51.50% iron natural, rail of vessel, lower lake ports.)

Old range bessemer	$10.30
Old range nonbessemer	10.15
Mesabi bessemer	10.05
Mesabi nonbessemer	9.90
Open-hearth lump	11.15
High phosphorus	9.90

The foregoing prices are based on upper lake rail freight rates, lake vessel freight rates, handling and unloading charges, and taxes thereon which were in effect on June 24, 1953, and increases or decreases after such date are for buyer's account.

Eastern Local Iron Ore

Cents per unit deld. E. Pa.

Foundry and basic 53-62% concentrates contract	17.00-18.00

Foreign Iron Ore

Cents per unit, c.i.f. Atlantic ports

Swedish basic, 60 to 66%	20.00
N. African hematite (spot)	nom. 20.00-22.00
Brazilian iron ore, 68-69% (spot)	25.00

Tungsten Ore

Net ton unit, before duty

Foreign, Wolframite, good commercial quality	$25.00-$26.00
Domestic scheelite, mine	63.00

Manganese Ore

Mn 48%, nearby, 90c-92c per long ton unit c.i.f. U. S. ports, duty for buyer's account: 46-47%, 80c.

Chrome Ore

Gross ton, f.o.b. cars New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., or Tacoma, Wash.

Indian and African	
48% 2.8:1	nom. $40.00-$42.00
48% 3:1	42.00-44.00
48% no ratio	32.00-34.00
South African Transvaal	
44% no ratio	$19.00-$20.00
48% no ratio	31.00-32.00
Domestic (Rail nearest seller)	
48% 3:1	$39.00

Molybdenum

Sulphide concentrate, per lb, Mo content mines unpacked	$1.00

Antimony Ore

Per unit of Sb content, c.i.f. seaboard

50-60%	$3.35-$3.85
60-65%	4.00-4.35

Vanadium Ore

Cents per lb V_2O_5 content, deld. mills

Domestic	31.00

Refractories

Fire Clay Brick (per 1000)

High-Heat Duty: Pueblo, Colo., $94; Ashland, Grahn, Hayward, Hitchins, Haldeman, Olive Hill, Ky., Athens, Troup, Tex., Beech Creek, Clearfield, Curwensville, Lock Haven, Lumber, Orviston, West Decatur, Pa., Bessemer, Ala., Farber, Mexico, St. Louis, Vandalia, Mo., Ironton, Oak Hill, Parral, Portsmouth, O., Ottawa, Ill., Stevens Pottery, Ga., $114; Salina, Pa., $119; Niles, O., $125; Los Angeles, Pittsburg, Calif., $137.20.

Silica Brick (per 1000)

Standard: Alexandria, Cinysburg, Mt. Union, Sproul, Pa., Ensley, Ala., Portsmouth, O., $120; Warren, Niles, O., Hays, Pa., $125; Morrisville, Pa., $123.50; E. Chicago, Ind., Joliet, Rockdale, Ill., $130; Cutler, Utah, $121.55; Los Angeles, $127.55.

Super Duty: Hays, Sproul, Pa., Warren, Windham, O., Athens, Tex., $137; Morrisville, Pa., Niles, O., $140; Joliet, Ill., $143.

Semisilica Brick (per 1000)

Clearfield, Pa., $130; Woodbridge, N. J., $114.

Insulating Fire Brick (per 1000)

2300° *F:* Massillon, O. $178.50; Clearfield, Pa., $213; Augusta, Ga., Beaver Falls, Kellenopple, Pa., Mexico, Mo., $206; Vandalia, Mo., $214.10; Portsmouth, O., $207.50; Bessemer, Ala., $212.80.

Ladle Brick (per 1000)

Dry Pressed: Bessemer, Ala., $64.60; Alsey, Ill., Chester, New Cumberland, W. Va., Freeport, Johnstown, Merrill Station, Pa., Mexico, Mo., $77.50; Wellsville, O., $81.50; Clearfield, Pa., Portsmouth, O., $87; Perla, Ark., $109; Los Angeles $110.25; Pittsburg, Calif., $111.30.

High-Alumina Brick (per 1000)

50 *Per Cent:* Clearfield, Pa., St. Louis, Mexico, Mo., $181; Danville, Ill., $169.30.

60 *Per Cent:* St. Louis, Mexico, Vandalia, Mo. Clearfield, Pa., $225; Danville, Ill., $213.20.

70 *Per Cent:* St. Louis, Mexico, Vandalia, Mo. $260; Danville, Ill., $258; Clearfield, Pa. $287.

Sleeves (per 1000)

Rossdale, Johnstown, Bridgeburg, Pa., $147; Clearfield, Pa., $148.50; St. Louis, $159.30; Athens, Tex., $155.

Nozzles (per 1000)

Rossdale, Pa., $234.70; Johnstown, Pa., $240.70; Clearfield, Pa., $241.40; St. Louis, $259.45; Athens, Tex., $247.70; Bridgeburg, Pa., $267.50.

Runners (per 1000)

Rossdale, Pa., Johnstown, Bridgeburg, Pa., $183.50; Clearfield, Pa., $185.50; St. Louis, $195.80; Athens, Tex., $191.80.

Dolomite (per net ton)

Domestic dead-burned bulk; Billmeyer, Blue Bell, Williams, Plymouth Meeting, York, Pa., Millville, W. Va., Bettsville, Millersville, Martin, Nario, Gibsonburg, Woodville, O., $14.50; Thornton, McCook, Ill., $15.10; Dolly Siding, Bonne Terre, Mo., $13.65.

Magnesite (per net ton)

Domestic, dead-burned bulk, ¼-in. grains with fines: Luning, Nev., Chewelah, Wash., $38.

Metallurgical Coke

Price per net ton

Beehive Ovens

Connellsville, furnace	$13.50-$14.00
Connellsville, foundry	16.50-17.00

Oven Foundry Coke

Kearny, N. J., ovens	$24.00
Everett, Mass., ovens	
New England, deld.	*26.05
Chicago, ovens	24.50
Chicago, deld.	26.00
Terre Haute, ovens	24.05
Milwaukee, ovens	25.25
Indianapolis, ovens	24.25
Cincinnati, deld.	25.85
Painesville, O., ovens	25.50
Cleveland, deld.	27.43
Erie, Pa., ovens	25.00
Birmingham, ovens	22.65
Cincinnati, deld.	27.58
Buffalo, ovens	25.00
Buffalo, deld.	26.25
Lone Star, Tex., ovens	18.50
Philadelphia, ovens	23.00
Swedeland, Pa. ovens	23.00
St. Louis, ovens	
St. Louis, deld.	26.00
St. Paul, ovens	23.75
Portsmouth, O., ovens	24.00
Cincinnati, O., deld.	26.62
Detroit ovens	25.50
Detroit, deld	26.50
Pontiac, deld.	27.06
Saginaw, deld.	28.56

*Or within $4.55 freight zone from works.

Coal Chemicals

Spot, cents per gallon, ovens

Pure benzol	40.00
Toluol, one deg	†32.00-35.00
Industrial xylol	†32.00-35.00

Per ton, bulk, ovens

Sulphate of ammonia	$42-$45
Birmingham area	†42.001

†With port equalization against imports.

Cents per pound, producing point

Phenol 40 deg. (U.S.P.), tank cars	18.00
c.l. drums	19.00
l.c.l. drums	19.50

Fluorspar

Metallurgical grades, f.o.b. shipping point, in Ill., Ky., net tons, carloads, effective CaF_2 content 72.5%, $35-$36; 70%, $32-$33; 60%, $28-$29. Imported, net tons, duty paid, metallurgical grade: European, $28-$30; Mexican, $25.50.

Electrodes

(Threaded with nipple, unboxed f.o.b. plant)

GRAPHITE

Diam.	Length	Per 100 lb
Inches		
2	24	$43.50
2½	30	28.00
3	40	27.25
4	40	26.00
5½	40	25.75
6	60	23.25
7, 8, 9, 10	60	21.00
12, 14	72	20.50
16	72	20.00
17	60	20.50
18, 20	72	20.00
	CARBON	
40	100	$8.95
40, 35, 30	110	8.95
30	84	9.10
24	96	8.90
24	72, 84	9.10
20	90	8.95
20	84	9.10
17	72	9.10
17	60	9.50
14	72	9.50
14, 12, 10	60	10.20
8	60	10.55

months that jobbers have done any anticipatory buying in New England.

Various grades of stainless and molybdenum alloy tubing are higher in price, the largest increase being in grade 347.

Cast-iron pipe demand in the Pacific Northwest is reported slow. New jobs, however, are reported in prospect and are expected out for early bidding. Seattle opened bids recently for 100 tons.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

3406 tons, terminal ramp, state turnpike, Newark, N. J., to American Bridge Division, U. S. Steel Corp., Pittsburgh.

2100 tons, widening of 62 bridges on the New Jersey turnpike, to Belmont Iron Works, Eddystone, Pa.

1625 tons, section 1, New York approach, Lincoln tunnel, New York, through the Gold Contracting Co., to American Bridge Division, U. S. Steel Corp., Pittsburgh.

1225 tons, Stanley R. Broff apartment, 415-429 East 79th St., Manhattan, New York, to Schacht Steel Construction Inc., that city.

1100 tons, electronics laboratory, Raytheon Corp., Wayland, Mass., to Groisser & Shlager Iron Works, Somerville, Mass., through Vappi & Co., Inc., Cambridge, Mass., general contractor.

780 tons, $3.5-million home-office building, Western Life Insurance Co., Helena, Mont., to unstated interest; Reidesel Construction Co., Billings, Mont., general contractor.

780 tons, bridge work, Frankfort creek flood control, Philadelphia, to Bethlehem Steel Co., Bethlehem, Pa.

740 tons, reconstruction, dry dock No. 3, Navy yard, Brooklyn, N. Y., through Corbetti Construction Co., to Bethlehem Steel Co., Bethlehem, Pa.

675 tons, navigation lock, The Dalles power project, as follows: Schmitt Steel Co., Portland, Oreg., 400 tons; L. B. Foster Co., Portland, 125 tons; Consolidated Western Steel Corp., San Francisco, 150 tons; by Atkinson Ostrander Co., general contractor. In addition, quantities were awarded on a job basis for which weights have not been computed.

645 tons, tank house, Phelps Dodge Corp., Laurel Hill, N. Y., to Bethlehem Steel Co., Bethlehem, Pa.

505 tons, junior high school No. 166, Brooklyn, N. Y., through John Rosenblum Inc., to Schacht Steel Construction Inc., New York.

310 tons, Masonic Memorial Hospital, Elizabethtown, Pa., to William Christenson Co., York, Pa.

300 tons, industrial building No. 5, Superior Combustion Industries Inc., Wilkes Barre, Pa., to the Wilkes Barre Iron & Wire Co., Wilkes Barre.

295 tons, two buildings, New Jersey Telephone Co., with 205 tons for a project in Merchantville, N. J., going to the Keystone Structural Steel Co., Trenton, N. J., and 90 tons for work at New Brunswick, N. J., going to the Hudson Structural Iron Works Co., Jersey City, N. J.

250 tons, DuPont laboratory, Wilmington, Del., to Joyce Steel Fabricator Inc., Chester, Pa.

225 tons, public school No. 130, Bronx, New York, through Grayco Builders, to the Central Structural Steel Co., Bronx, New York.

225 tons, addition to hangar, air base, Willow Grove, Pa., to Max Corchin & Sons, Philadelphia.

150 tons, 60-ton bridge-type log crane for Port of Grays Harbor, Aberdeen, Wash.; also gantry crane for U. S. Navy, to Berger Engineering Co., Seattle.

120 tons, galvanized towers, American Gas & Electric Service Co., Toronto, O., to American Bridge Division, U. S. Steel Corp., Pittsburgh.

115 tons, addition, public school No. 21, Brooklyn, N. Y., through the Planet Construction

Co., to Dreier Structural Steel Co. Inc., Long Island City, N. Y.

110 tons, Stouffer's restaurant, Wynnewood, Pa., to Max Corchin & Sons, Philadelphia.

45 tons, galvanized transmission towers, Seattle Light Department, to Bethlehem Pacific Coast Steel Corp., Seattle.

STRUCTURAL STEEL PENDING

2430 tons, Long Sault dam, St. Lawrence seaway project, near Messena, N. Y; bids Mar. 9, Power Authority, State of New York; also erection of gates and cranes, 5810 tons.

2075 tons, ten state bridges, Massachusetts turnpike; bids Jan. 27, Boston.

1750 tons, also 85 tons reinforcing, machinery, etc., Seattle First Ave. So. bascule state bridge; bids in.

1665 tons, ten bridges, Massachusetts turnpike, Grafton-Westboro-Upton-Hopkinton, Mass.

955 tons, five bridges, Massachusetts turnpike, Sturbridge-Charlton, Mass.; bids Feb. 1, Boston.

920 tons, for sections 37-F and 37-G, state turnpike, Luzerne county, Pa.; bids Feb. 8.

800 tons, trunnion-type draw bridge, Malden river, Medford-Everett, Mass.; bids Feb. 3, State Highway Department, Boston.

290 tons, also 30 tons of sheet-steel piling, Washington state highway projects, Whatcom, Adams and Franklin counties; bids to Olympia, Wash., Feb. 1.

150 tons, pedestrian overpass, Charles river reservation, Boston; bids Jan. 27, Massachusetts District Commission, Boston.

Unstated, alert hangar, Great Falls, Mont., air base, Wilson-Smith Construction Co., Great Falls, Mont., and Northwestern Engineering Co., Rapid City, S. Dak., joint low $478,819, to U. S. Engineer, Seattle.

Unstated, maintenance shop, Ladd Air Field, Alaska, 102 x 122 ft; bids to U. S. Engineer, Anchorage, Alaska, Feb. 15.

Unstated, warehouse and utility buildings, Chief Joseph dam; bids to U. S. Engineer, Seattle, Feb. 11, Spec. No. 55-30.

REINFORCING BARS . . .

REINFORCING BARS PLACED

3300 tons, navigation lock, The Dalles dam, to Steel Construction Co. and Rutherford & Skoubye, Portland, Oreg., by Atkinson Ostrander Co., general contractor; general contract awarded in September, 1954 by U. S. Engineer, Portland, Oreg.

900 tons, bridge substructure and deck, Chicopee river, Springfield connection to route 20, Chicopee, Mass., to Bethlehem Steel Co., Bethlehem, Pa., through E. T. O'Neill & Son Construction Co., Holyoke, Mass., general contractor.

210 tons, two stringer bridges, Dedham-Westwood, Mass., to Bethlehem Steel Co., Bethlehem, Pa., through Munroe—Langstroth Inc., Norwood, Mass., subcontractor for bridges, state project.

122 tons, addition, state training school, Chehalis, Wash., to J. D. English Steel Co., Tacoma, Wash.

100 tons, electronics laboratory, Raytheon Corp., Wayland, Mass., to Groisser & Shlager Iron Works, Somerville, Mass., through Vappi & Co. Inc., Cambridge, Mass., general contractor.

90 tons, addition, Buckley Training School, to Joseph T. Ryerson & Son Inc., Seattle.

56 tons, highway project, near Tumwater, Wash., to Bethlehem Pacific Coast Steel Corp., Seattle.

REINFORCING BARS PENDING

1040 tons, ten bridges, Massachusetts turnpike, Framingham, Mass.; bids Jan. 27, Boston.

990 tons, ten bridges, Massachusetts turnpike, Grafton-Upton-Westboro-Hopkinton, Mass.

900 tons, Washington state highway projects; bids in.

750 tons, five bridges, Massachusetts turnpike, Sturbridge-Charlton, Mass.; bids Feb. 1, Boston.

475 tons, state highway bridges, West Haven, Conn.

250 tons, telephone building, Salem, Mass.

200 tons, oil-storage installation, Naknek base, Alaska; bids in.

150 tons, drawbridge, Malden river, Medford-Everett, Mass.; bids Feb. 3, Department of Public Works, Boston.

125 tons, Washington state highway projects; bids to Olympia, Wash., Feb. 1.

PLATES . . .

PLATES PENDING

650 tons, one million-gal standpipe and 500,000-gal elevated tank; bids Jan. 27, Latham Water District, Colonie, N. Y.

600 tons, six fuel-storage tanks, Naknek, Alaska, air base; bids in to U. S. Engineer.

200 tons, storage tank, Water District No. 74, Seattle; bids in.

135 tons, hull plates, black, Navy Purchasing Office, Washington, invitation 803; bids Jan. 25.

125 tons, 250,000-gal elevated water tank, Wingate Ordnance Depot, Gallup, N. Mex.; bids Feb. 15, Corps of Engineers, Albuquerque, N. Mex.

PIPE . . .

STEEL PIPE PLACED

5500 tons, 28 miles of 20-in. welded steel, to Kaiser Steel Co., Fontana, Calif., and nine miles of 16-in. seamless to National Tube Division, U. S. Steel Corp., for extension to new refinery, Shell Oil Co., Anacortes, Wash., by Trans-Mountain Oil Pipe Line Corp., Vancouver, B. C.,; Engineers Ltd. Pipeline Co., general contractor; office in Seattle.

RAILS, CARS . . .

RAILROAD CARS PLACED

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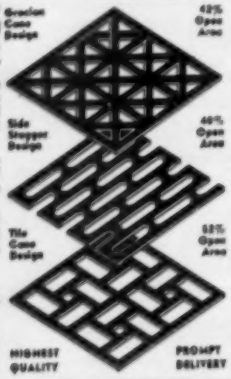

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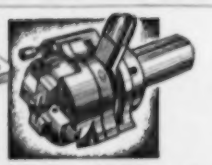

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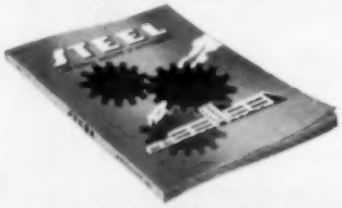

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Scrap . . .

Scrap Prices, Page 124

Philadelphia — Steadiness marks scrap prices generally. Most district mills are placing a little tonnage and a moderately good movement is reported for export. Three cargoes have left this port so far this month, with two vessels loading and another awaiting dock. For highly selected material foreign consumers are paying a little more here and there, but, in general, export prices appear stable.

Only revision in the entire scrap list is a $1 increase in couplers, springs and wheels to $36, delivered consumer plant. Structurals and plate scrap are moving poorly and only a limited tonnage of machine shop turnings and mixed borings and turnings is being purchased.

Pittsburgh—Something of a mixed situation prevails in the scrap market here. Sentiment is less bullish than it was earlier in the month but, in the main, prices are unchanged.

One sale of 10,000 tons of various grades of scrap to one of the large mills here last week served to unsettle the market for a time. It appeared the material was taken at lower prices than those recently prevailing. However, the purchase was two pronged: It included both local scrap and material from outside the home area. Lower prices were quoted on the local material, but the market held unchanged on shipments from a distance.

Under this arrangement the local No. 1 heavy melting went at $34.50, with outside No. 1 at $37; No. 2 heavy melting, local, $31.50, outside at $34; No. 2 bundles, $29, both local and outside.

Buffalo—Dealers and consumers appear content to mark time within the prevailing price ranges on scrap. Shipments are being made against old orders. Little enthusiasm is shown here over higher prices quoted at some other points.

New York—Brokers have advanced buying prices 50 cents per ton on the major steel grades. No. 1 heavy melting and No. 1 bundles are now quoted $27.50-$28.50, No. 2 heavy melting $25.50-$26 and No. 2 bundles $20.50-$21. Other steel grades, including cast iron are unchanged.

Most eastern mills are buying modest lots. Sales abroad continue fairly active, with brokers covering through February.

Strength in stainless steel scrap is reflected in an advance on 18-8 sheets, clips and solids from $170-$175 to $180-$185. Brokers are paying more for type-430 sheets, clips and solids, $55-$60 compared with $50 recently. Last week price increases were noted on other stainless steel scrap.

Cleveland—Some of the recent optimism prevailing in the scrap market faded the past week or so. Steelmakers continue to restrict purchases to small lots and are adding blast furnaces to the active list as they step up ingot operations.

In this immediate district the bullishness in the market has been tarnished by the taking off of a couple of openhearths for repairs at one of the large steel plants. This resulted in holding up some shipments on old contracts. Scrap, however, is moving in good volume to Valley mills.

Despite the sluggishness, prices, for the present at least, are holding unchanged with No. 1 heavy melting quoted $33-$34. The scrap grades also are steady with the foundries doing a little more buying. Indications are there will be no price developments of note until auto lists come out this week.

Chicago—Recent bullishness in the scrap market has faded, but so far prices have not dropped below recently attained high ground. It isn't due to any recession in the steelmaking rate but to reduced buying by mills. Following the price advances of a fortnight ago, consumers showed no interest in sustained buying and even imposed a regulation on shipments.

St. Louis—The scrap market here is firm and steady. Mills are increasing their intake a trifle but not with sufficient pressure to bulge the price structure. Melting steel and some railroad grades have inched up about $1 in the last two weeks. Scrap shipments to dealers continue good under open-weather conditions.

Los Angeles—Steelmaking scrap prices have advanced $3 to $8 per ton. Cast grades remain unchanged. No. 1 heavy-melting steel advanced from $20 to $28 and No. 2 rose $8 to $24. No. 1 bundles moved up from $20 to $27, No. 2 from $16 to $22. Machine shop turnings are listed at $8, an increase of $3.

San Francisco—Two cargoes, each totaling around 9000 tons of steel scrap, are loading for shipment to Japan this month. The only other feature of the scrap market is the weak tone of cast-iron grades. Prices, however, continue unchanged.

Seattle—In the face of small-volume trading and lack of exports prices on heavy-melting steel scrap have advanced $2 per ton, bundles and turnings $1. Cast iron is unchanged.

Scrap production is low but buying is lagging. Larger interests have good inventories, and some are out of the market entirely. The strong tone here is attributed to exports from the California area.

Boston — Steel scrap prices are slow to edge upward. The leading district consumer of No. 1 heavy melting has bought some tonnage, but demand from Pennsylvania mills is not heavy in this area. Loadings for export continue, though less tonnage is moving.

Cincinnati—Machine shop turnings advanced $3 per ton to a range of $16-$17, while short shoveling turnings climbed $2 to $19-$20.

Pig Iron . . .

Pig Iron Prices, Page 111

Demand for pig iron is shaping up slowly in the East, while making slight gains in the Midwest.

One leading producer believes his business in the New York area will be smaller this month than it was in November or December, despite the holiday lull in the latter month. It boils down to lack of castings orders; foundries generally are disappointed over the way the new year started off.

The No. 4 blast furnace at National Works of National Tube Division, U. S. Steel Corp., McKeesport, Pa., was temporarily banked Jan. 13. The purpose is to balance stocks with production needs of its seamless pipe mills.

Republic Steel Corp. has relighted its No. 5 blast furnace at Youngstown, its third stack in operation there. It also started up two more open hearths within the past 10 days. The increased activity reflects steadily rising steel orders.

Main strength of the pig iron market in the Chicago district stems from the high rate of activity at automotive foundries. In addition, some farm implement foundries are increasing production schedules a notch and others report generally heavier demand for castings.

Pig iron sellers in the St. Louis district expect to book during January the largest volume of business for any month in the last 12. Granite City

(*Please turn to page* 126)

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Iron and Steel Scrap

Consumer prices, per gross ton, except as otherwise noted, including broker's commission, as reported to STEEL. Changes shown in italics.

STEELMAKING SCRAP COMPOSITE

Jan. 19	$35.00
Jan. 12	35.00
Dec. Avg.	32.58
Jan. 1954	29.05
Jan. 1950	26.93

Based on No. 1 heavy melting grade at Pittsburgh, Chicago and eastern Pennsylvania.

PITTSBURGH

(Delivered consumer plant)

No. 1 heavy melting	36.00-37.00*
No. 2 heavy melting	35.00-34.00†
No. 1 bundles	36.00-37.00
No. 2 bundles	28.00-29.00
No. 1 busheling	36.00-37.00
Machine shop turnings	18.00-19.00
Mixed borings, turnings	18.00-19.00
Short shovel turnings	22.00-23.00
Cast iron borings	22.00-23.00
Cut structurals, 5 ft lengths	37.00-38.00
Heavy turnings	*34.00-35.00*
Punchings & plate scrap	*39.00-40.00*
Electric furnace bundles	38.00-39.00

Cast Iron Grades

No. 1 cupola	36.00-37.00
Charging box cast	31.00-32.00
Heavy breakable cast	31.00-32.00
Unstripped motor blocks	22.00-23.00
No. 1 machinery cast	42.00-43.00

Railroad Scrap

No. 1 R.R. heavy melt	38.00-39.00
Rails, 2-ft and under	47.00-48.00
Rails, 18-in. and under	48.00-49.00
Rails, random lengths	*43.00-44.00*
Railroad specialties	40.00-41.00

Stainless Steel Scrap

18-8 bundles & solids	*190.00-200.00*
18-8 turnings	90.00-95.00
430 bundles & solids	85.00-90.00
430 turnings	60.00-62.00

*Local scrap	34.50
†Local scrap	31.50

CLEVELAND

(Delivered consumer plant)

No. 1 heavy melting	33.00-34.00
No. 2 heavy melting	29.00-30.00
No. 1 bundles	33.00-34.00
No. 2 bundles	26.00-27.00
No. 1 busheling	33.00-34.00
Machine shop turnings	16.00-17.00
Mixed borings, turnings	20.00-21.00
Short shovel turnings	20.00-21.00
Cast iron borings	20.00-21.00
Low phos.	33.00-34.00
Cut structural plate 2 ft and under	38.00-39.00
Alloy free, short shovel turnings	23.00-24.00
Electric furnace bundles	33.00-34.00

Cast Iron Grades

No. 1 cupola	44.00-45.00
Charging box cast	33.00-34.00
Stove plate	38.00-39.00
Heavy breakable cast	30.00-31.00
Unstripped motor blocks	28.00-29.00
Brake shoes	30.00-31.00
Clean auto cast	43.00-44.00
No. 1 wheels	37.00-38.00
Burnt cast	29.00-30.00
Drop broken machinery	44.00-45.00

Railroad Scrap

No. 1 R.R. heavy melt.	35.00-36.00
R.R. malleable	44.00-45.00
Rails, 2-ft and under	48.00-49.00
Rails, 18-in. and under	49.00-50.00
Rails, random lengths	43.00-44.00
Cast steel	36.00-37.00
Railroad specialties	37.00-38.00
Uneut tires	37.00-38.00
Angles, splice bars	42.00-43.00
Rails, rerolling	52.00-53.00

Stainless Steel (Brokers' Buying Prices)

18-8 bundles, solids	190.00-200.00
18-8 turnings	80.00-90.00
430 clips, bundles, solids	80.00
430 turnings	40.00-50.00

YOUNGSTOWN

(Delivered consumer plant)

No. 1 heavy melting	36.00-37.00
No. 2 heavy melting	32.00-33.00
No. 1 bundles	36.00-37.00
No. 2 bundles	27.50-28.50
No. 1 busheling	36.00-37.00
Machine shop turnings	14.00-15.00
Short shovel turnings	22.00-23.00
Cast iron borings	22.00-23.00
Low phos.	36.00-37.00
Electric furnace bundles	36.00-37.00

Railroad Scrap

No. 1 R.R. heavy melt.	36.00-37.00

CHICAGO

No. 1 heavy melting	34.00-36.00
No. 2 heavy melting	32.00-33.00
No. 1 factory bundles	36.00-37.00
No. 1 dealer bundles	33.00-34.00
No. 2 bundles	24.00-25.00
No. 1 busheling	34.00-36.00
Machine shop turnings	17.00-18.00
Mixed borings, turnings	19.00-20.00
Short shovel turnings	19.00-20.00
Cast iron borings	19.00-20.00
Cut structurals, 3 ft	36.00-37.00
Punchings & plate scrap	37.00-38.00
Electric furnace bundles	36.00-37.00

Cast Iron Grades

No. 1 cupola	39.00-41.00
Stove plate	34.00-35.00
Unstripped motor blocks	26.00-27.00
Clean auto cast	44.00-45.00
Drop broken machinery	44.00-45.00

Railroad Scrap

No. 1 R.R. heavy melt.	38.00-39.00
R.R. malleable	44.00-45.00
Rails, 2-ft and under	50.00-51.00
Rails, 18-in. and under	51.00-52.00
Angles, splice bars	43.00-44.00
Rails, rerolling	52.00-54.00

Stainless Steel Scrap

18-8 bundles & solids	190.00-195.00
18-8 turnings	95.00-100.00
430 bundles & solids	*80.00-85.00*
430 turnings	*45.00-50.00*

Chicago Mercantile Exchange

(Week ended Jan. 19)

No. 1 Heavy Melting

	High	Low	Close
Jan.	36.50	36.50	36.50
Mar.	36.00	36.00	36.00*

No. 2 Heavy Melting

Feb.	33.00	33.00	33.00*

Sales (40-ton Units): 1 January; 3 February; 4 March.
*Nominal.

DETROIT

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	27.00
No. 2 heavy melting	*21.00*
No. 1 bundles	27.00
No. 2 bundles	*19.50*
No. 1 busheling	26.00
Machine shop turnings	11.00
Mixed borings, turnings	11.00
Short shovel turnings	15.00
Punchings & plate scrap	29.00

Cast Iron Grades

Charging box cast	27.00
No. 1 cupola	34.00
Stove plate	30.00
Heavy breakable	25.00
Unstripped motor blocks	20.00
Clean auto cast	38.00
Malleable	36.00

CINCINNATI

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	31.00-32.00
No. 2 heavy melting	26.00-26.00
No. 1 bundles	31.00-32.00
No. 2 bundles	20.00-21.00
No. 1 busheling	31.00-32.00
Machine shop turnings	*16.00-17.00*
Mixed borings, turnings	17.00-18.00
Short shovel turnings	*19.00-20.00*
Cast iron borings	17.00-18.00
Low phos. 18-in.	35.00-36.00

Cast Iron Grades

No. 1 cupola	39.00
Heavy breakable cast	35.00
Charging box cast	36.00
Drop broken machinery	45.00

Railroad Scrap

No. 1 R.R. heavy melt.	33.00-34.00
Rails, 18-in. and under	46.00-47.00
Rails, random lengths	38.00-39.00

PHILADELPHIA

(Delivered consumer plant)

No. 1 heavy melting	33.50
No. 2 heavy melting	30.50-31.00
No. 1 bundles	33.50
No. 2 bundles	26.50-27.00
No. 1 busheling	31.50
Electric furnace bundles	34.00
Machine shop turnings	19.00
Mixed borings, turnings	19.50
Short shovel turnings	21.00
Structurals & plate	35.00
Heavy turnings	29.50-30.00
Couplers, springs, wheels	*36.00*
Rail crops, 2 ft & under	48.00

Cast Iron Grades

No. 1 cupola	35.00
Malleable	41.50-43.00
Heavy breakable cast	37.00
Drop broken machinery	42.00-43.00

NEW YORK

(Brokers' buying prices)

No. 1 heavy melting	*27.50-28.50*
No. 2 heavy melting	*25.50-26.00*
No. 1 bundles	27.00-28.00
No. 2 bundles	*20.50-21.50*
Machine shop turnings	10.00-10.50
Mixed borings, short turnings	11.00-12.00
Low phos. (structural & plate)	30.00-31.00
Short shovel turnings	12.00-13.00

Cast Iron Grades

No. 1 cupola	29.00-30.00
Unstripped motor blocks	22.00-23.00

Stainless Steel

18-8 sheets, clips, solids	175.00-180.00
18-8 borings, turnings	80.00-85.00
430 sheets, clips, solids	55.00-60.00
410 sheets, clips, solids	45.00-50.00

BOSTON

(Brokers' buying prices; f.o.b shipping point)

No. 1 heavy melting	24.00-25.00
No. 2 heavy melting	*20.00-21.00*
No. 1 bundles	24.50-25.00
No. 2 bundles	16.25-17.00
Mixed borings, turnings	9.50-10.00
Machine shop turnings	8.00-8.50
Short shovel turnings	10.50-11.00
No. 1 cast	29.00-30.00
Mixed cupola cast	27.00-28.00
No. 1 machinery cast	32.00-33.00

BUFFALO

No. 1 heavy melting	30.00-31.00
No. 2 heavy melting	25.50-26.00
No. 1 bundles	30.00-31.00
No. 2 bundles	23.50-24.50
No. 1 busheling	30.00-31.00
Machine shop turnings	18.00-19.00
Mixed borings, turnings	20.00-21.00
Short shovel turnings	21.00-22.00
Cast iron borings	20.00-21.00
Low phos.	33.50-34.50

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	38.00-39.00
No. 1 machinery	43.00-44.00

Railroad Scrap

Rails, random lengths	35.00-36.00
Rails, 3 ft and under	42.00-43.00
Railroad specialties	36.50-37.50

BIRMINGHAM

No. 1 heavy melting	*28.00-29.00*
No. 2 heavy melting	24.00-25.00
No. 1 bundles	23.00-24.00
No. 2 bundles	19.00-20.00
Cast iron borings	16.00-17.00
Short shovel turnings	16.00-17.00
Machine shop turnings	15.00-16.00
Electric furnace bundles	29.00-30.00

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	45.00-46.00
Stove plate	42.00-43.00
Bar crops and plate	33.00-34.00
Structural plate, 2 ft	33.00-34.00
Unstripped motor blocks	33.00-36.00

Railroad Scrap

No. 1 R.R. heavy melt.	32.00-33.00
Rails, 18-in. and under	40.00-41.00
Rails, rerolling	40.00-41.00
Angles, splice bars	38.00-39.00
Stand. steel axles	35.00-36.00

ST. LOUIS

(Brokers' buying prices)

No. 1 heavy melting	*31.00*
No. 2 heavy melting	*29.00*
No. 1 bundles	*31.00*
No. 2 bundles	*24.50*
Machine shop turnings	13.00
Short shovel turnings	15.00

Cast Iron Grades

No. 1 cupola	40.00
Charging box cast	32.50
Heavy breakable cast	32.50
Unstripped motor blocks	32.50
Brake shoes	30.00
Clean auto cast	41.00
Stove plate	36.50

Railroad Scrap

No. 1 R.R. heavy melt.	35.50
Rails, 18-in. and under	46.00
Rails, random lengths	*42.00-43.00*
Rails, rerolling	*49.00*
Angles, splice bars	39.00-40.00

SEATTLE

(Delivered consumer plant)

No. 1 heavy melting	*29.00*
No. 2 heavy melting	*25.00*
No. 1 bundles	21.00
No. 2 bundles	*18.00*
No. 3 bundles	*14.00*
Machine shop turnings	12.00
Mixed borings, turnings	12.00
Short shovel turnings	12.00
Electric furnace, No. 1	32.00

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	*32.00*
Heavy breakable cast	23.00
Unstripped motor blocks	25.00
No. 1 wheels	21.00
Stove plate (f.o.b. plant)	28.00
Brake shoes	28.00

Railroad Scrap (Delivered consumer plant)

Rails, random lengths	30.00-34.00

LOS ANGELES

No. 1 heavy melting	*28.00*
No. 2 heavy melting	*24.00*
No. 1 bundles	*27.00*
No. 2 bundles	*22.00*
Machine shop turnings	*8.00*

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	42.00-44.00

SAN FRANCISCO

No. 1 heavy melting	24.00
No. 2 heavy melting	20.00
No. 1 bundles	23.00
No. 2 bundles	18.00
No. 1 busheling	24.00
Machine shop turnings	6.00
Mixed borings, turnings	6.00
Short shovel turnings	9.00
Cast iron borings	9.00
Cut structurals	25.00
Heavy turnings	9.00
Punchings & plate scrap	25.00
Electric furnace bundles	19.00

Cast Iron Grades

No. 1 cupola	40.00
Charging box cast	35.00
Stove plate	37.00
Heavy breakable cast	36.00
Unstripped motor blocks	30.00
Brake shoes	35.00
Clean auto cast	39.00
No. 1 wheels	39.00
Burnt cast	23.00
Drop broken machinery	48.00

HAMILTON, ONT.

(Delivered prices)

No. 1 heavy melting	26.00
No. 2 heavy melting	23.00
No. 1 bundles	26.00
No. 2 bundles	21.00
Mixed steel scrap	20.00
Mixed borings, turnings	12.00
Rails, remelting	35.00
Busheling, new factory:	
Prepared	24.00
Unprepared	20.00
Short steel turnings	12.00

Cast Iron Grades†

No. 1 machinery cast	42.00-45.00

†F.o.b., shipping point.

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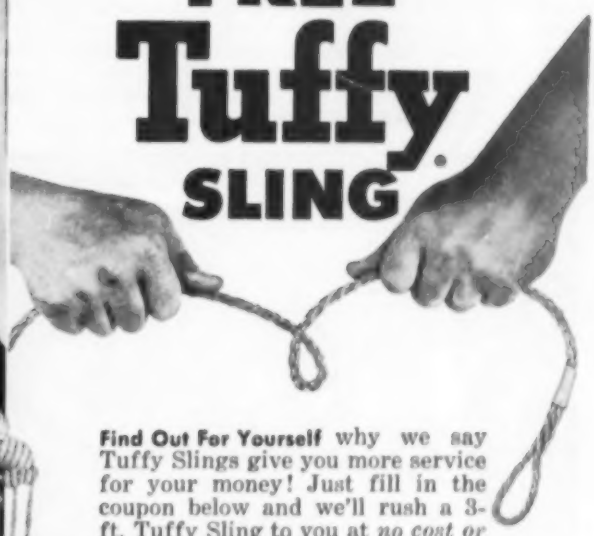

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(*Concluded from page 123*)

Steel Co.'s two blast furnaces at Granite City, Ill., are on basic iron. The company reports order bookings at steel foundries are moderately heavier.

In the Pacific Northwest, plants generally are using foreign pig iron. One large consumer receives monthly shipments from Australia, ordering six months in advance. This iron is reportedly of excellent quality and sells in the Seattle area about $8 a ton under the price for domestic iron. Most foundries are carrying fairly heavy inventories and are not buying actively.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 106

Steel Rolling Mills Inc., Oklahoma City, Okla., recently started producing reinforcing bars, averaging 350 tons monthly. The company, William R. Slinger, president, has a ten-year lease on the plant formerly operated by the Hoster Steel Co.

While Pacific Northwest rolling mills are producing steadily, new reinforcing-bar business in the area is not active and more orders are needed to continue present schedules. The first quarter, however, is expected to round out to levels for the corresponding period of 1954. Bids for Washington state highway projects, opened a week ago, involve 900 tons of reinforcing.

Warehouse . . .

Warehouse Prices, Page 111

Warehouse business ranges from strong to spotty, depending on location and type of product. Location of the warehouse is a particularly important factor now because demand from machine tool builders is slow, while that from the automotive industry continues strong. There is a similar wide divergence in activity among other important consuming industries. All indicators suggest a rising demand over the next three months or so before a leveling off may occur.

Except for light flat-rolled items, including cold-rolled, galvanized and enameling sheets, distributors in the Chicago area find no pressure for steel. Sales volume of these items is limited only by the ability of warehouses to obtain supplies from mills.

In the New York market, hot-rolled sheet bookings lag. The average size of individual orders is small and distribution costs are higher.

Sheet and bar orders in the Pittsburgh area are increasing. Sheet sales remain low compared with those reported by mills, due to the low number of small sheet consumers in that area. Generally, over-all sales are considered at a "low normal."

Distributors of domestically produced steel are meeting lessened competition from those offering imported material. Foreign mills have less tonnage to export.

Refractories . . .

Refractories Prices, Page 120

Chemical Division, Kaiser Aluminum & Chemical Corp., plans a $4-million plant to produce refractories at Columbiana, O. Construction is scheduled to start in April. In addition to increasing the company's capacity for producing basic-brick and ramming mixes, the new plant will enable the Chemical Division to give better service to steelmakers and other industries in the East and Midwest. Production, concentrated on basic brick, will be divided between the high-magnesia periclase, periclase-chrome and chrome-periclase types.

Move 23-per-cent Less Steel

Direct mill shipments of steel products (excluding tonnage to industry members for further conversion or resale) totaled 57,725,231 net tons in the first 11 months of 1954, reports

It's Hot-Dip Galvanized

Half a football field high and all galvanized, this oil derrick manufactured by the Lee C. Moore Corporation stands up to rugged western weather all the year round.

Angles, stairs, platforms, bolts and nuts, from top to bottom, have to be protected from rust.

Hot-Dip Galvanizing was selected. Here's why: With Hot-Dip Galvanizing you get the thickest, most uniform coating with no open pores to let rust begin—thus costly maintenance is reduced to a minimum and necessity for replacement is eliminated. The original cost of Hot-Dip Galvanizing is economical too. Ready for erection, galvanized structures will not flake off. A thick, uniform coating means complete protection throughout. Sealed in zinc, the tower will not rust.

Whether it's an industrial tower or a garbage can for your back yard, remember if it's iron or steel, have it Hot-Dip Galvanized. For the best in galvanizing, send your products to a member of the American Hot Dip Galvanizers Association—he has the know-how to give you a top quality job.

Send today for our new booklet "Stop Rust." It gives you the full story on the process, plus a comprehensive coating comparison chart. "Must It Rust" 16 mm film available for showing.

AMERICAN HOT-DIP GALVANIZERS ASSOCIATION

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Alabama

Steel Fabricator requires services of man experienced in industrial engineering. Excellent opportunity.

Confidence maintained.

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DIVISION ENGINEER

Mechanical Engineer needed by large Phila. bearing manufacturer. Must have machine design background and steel mill maintenance experience. Involves customer contact, consulting, sales engineering and supervision of steel mill bearing installations.

Give full particulars including age, education, experience and salary desired to —

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Help Wanted

ASSISTANT SUPERINTENDENT
Cold Drawn Mill in East has opening for young man 23-30, graduate of college or technical school. Should have some engineering and production line experience. Replies will be held confidential. Reply Box 188, STEEL, Penton Building, Cleveland 13, Ohio.

METALLURGICAL ENGINEER, Iron and Steel Process Metallurgist or equivalent in experience. Good student, minimum 5 years general integrated steel plant experience. Excellent opportunity. Eastern Seaboard. All replies confidential. State minimum salary desired. Reply Box 194, STEEL, Penton Building, Cleveland 13, Ohio.

TWO METALLURGISTS NEEDED—one for plant production, other for sales. Young men preferred, with recent metallurgical degrees from recognized universities. Plant position in southern New Jersey; sales position involves traveling in middle west, headquarters New York office. This company produces powdered metals, alloys, processed minerals, master alloys, and chromium metal. Write full details to Box 196, STEEL, Penton Building, Cleveland 13, Ohio.

ABRASIVE ENGINEER to head up basic research and development of abrasive products used by machine tools on precision machining. Must have background in surface grinding techniques, surface finishes and speeds and feeds of abrasive wheels for various application. Required also is knowledge of grits, bonding materials and wheel forming techniques. Newly constructed plant and laboratories located in medium sized mid-western city. Salary over $10,000. Reply Box 201, STEEL, Penton Building, Cleveland 13, Ohio.

Positions Wanted

PLANT AND PRODUCTION MANAGER, Engineering Graduate (M.I.T.) indoctrinated in practical operating experience. Proven record of accomplishment in efficient plant supervision, control, and cost reduction coupled with amicable labor relations. Reply Box 134, STEEL, Penton Building, Cleveland 13, Ohio.

CHIEF METALLURGICAL ENGINEER—heavy automotive equipment past ten years. Fifteen years metallurgical and engineering research. Continuous record of improved and simplified fabrication and cost reduction. Reply Box 197, STEEL, Penton Building, Cleveland 13, Ohio.

FORGING ENGINEER AVAILABLE AS MANAGER OR ASSISTANT SMALL OR MEDIUM SIZED SHOP. EXPERIENCE COVERS SUPERVISION, ESTIMATING, DESIGNING, PURCHASING, PRODUCTION. REPLY BOX 198, STEEL, PENTON BUILDING, CLEVELAND 13, OHIO.

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Well-established industrial manufacturer, multiple plant operation, seeks General Manager over all manufacturing and sales. Must have successful record in management. Location Chicago area. Salary plus incentive plan. Detailed reply should include salary requirements, education, experience, personal background, photo and references. Replies held in strictest confidence.

Reply Box 195, STEEL
Penton Building Cleveland 13, Ohio

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1—12" x 16" Waterbury Farrel Foundry & Machine Co. 2-high cold mill used for temper rolling consisting of:

1—Roll Stand equipped with composition water cooled bearings.
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1—Double reduction gear drive, ratio 9.87 to 1.
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1—Littell pay-off reel with electric brake, 16" expanding drum.
1—Coiling reel with 17" drum, driven by 30-40 HP, 400/1600 RPM D.C. Motor.
2 Coil Handling Trucks with hydraulic lifts for loading and unloading reels.
Numerous spare parts.

This mill is offered at $18,000.00 f.o.b. Sinking Spring, Penna. A real bargain!

HOFMANN INDUSTRIES, INC.
SINKING SPRING, PENNA.

FORGING AND HEAT TREATING EQUIPMENT FOR SALE
USED—AS IS

1 Model F—1500# Chambersburg Board Drop Hammer, Belt driven. New in 1919. Serial No. 3912-S. Complete with all parts. In operating condition and may be inspected under power.
1 Model F—1200# Chambersburg Board Drop Hammer, Belt driven. New in 1916. Serial No. 2978-S1. In good operating condition. Can be inspected under power.
1 Model F—1200# Chambersburg Board Drop Hammer, Belt driven. Serial No. 154. In good operating condition. Can be inspected under power.
1 Model F—1200# Chambersburg Board Drop Hammer, Belt driven. Serial No. 2623-S1. New in 1915. In good operating condition. Can be inspected under power.
1 Model F—1000# Chambersburg Board Drop Hammer, Belt driven. New in 1916. Serial No. 3023-S1. In good operating condition. Can be inspected under power.
1—Complete Chambersburg Roller Bearing Type Head Section for 2500# Model F Board Hammer. Serial No. 3319-S2. New in 1942. In good operating condition.
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1 Water Jacketed Quenching Tank. Inside dimensions 48" wide x 79" long x 3' deep. Excellent condition.
1 Model 15KVA Lepel Converter Spark Gap Type. Serial No. 4893. With automatic turn table and fixtures. Never used.
1 Gas Fired "SURFACE COMBUSTION COMPANY" Hearth Furnace. Hearth depth 6' 6" x 36" wide x 22" high. Bottom fired. Excellent condition.
1 Oil Fired Hardy Double Hearth Furnace. 65" deep x 28" wide x 14" high. Bottom fired. Good condition.
1 Stewart Oil Fired Hearth Furnace. Mfg'd. by CHICAGO FLEXIBLE SHAFT CO. Hearth depth 6' x 36" wide x 24" high. Bottom fired. Excellent condition.

Reply Box 193, STEEL
Penton Building Cleveland 13, Ohio

the American Iron & Steel Institute. This was a decline of 16,777,449 tons, about 23 per cent, compared with 74,502,680 moved in the first 11 months of the preceding year.

Significantly, the percentage drop in ingot production during the period just about equaled that of mill shipments. Ingot output was 80,024,579 net tons, off 23,638,812 from the 103,663,391 tons produced in the first 11 months of 1953.

These figures indicate direct mill shipments and ingot production kept pretty much in step with each other. Actual consumption of steel, however, is not fully reflected in the shipment figures, a substantial portion of metalworking steel requirements during the period having been taken from inventories.

Despite the over-all decline in mill shipments, some products moved in heavier volume during the 11 months compared with the preceding year. They were: Skelp, steel piling, oil-country goods, nails and staples, woven wire fence, bale ties, hot-dipped tin and terne plate, electrolytic tin plate, galvanized sheets.

Breakdown of product shipments (carbon, alloy and stainless) for the 11 months, compared with totals for the like period of 1953, is given in the accompanying table.

Steel Import Prices

(Base, per 100 lb, landed, duty paid)

	North Atlantic	South Atlantic	Gulf Coast	West Coast‡
Deformed Bars, Intermediate, ASTM-A-305	$5.50*	$5.50*	$5.50*	$5.78*
Bar Size Angles	5.25*	5.25*	5.25*	5.53*
Structural Angles	5.00*	5.00*	5.00*	5.28*
I-Beams	5.00*	5.00*	5.00*	5.28*
Wide Flange Beams	5.15*	5.15*	5.15*	5.43*
Furring Channels, C.R., 1000 ft, ⅞ x 0.30 lb per ft	28.30	28.50	28.30	29.10
Barbed Wire (†)	6.05	6.05	6.05	6.23
Merchant Bars	5.50*	5.50*	5.50*	5.78*
Hot-Rolled Bands	6.00*	6.00*	6.00*	6.28*
Wire Rods, Thomas Commercial No. 5	5.40*	5.40*	5.40*	5.68*
Wire Rods, O-H Cold Heading Quality No. 5	5.85*	5.85*	5.85*	6.13*
Bright Common Wire Nails	7.15	7.15	7.15	7.45

‡Not including $2.20 per net ton customarily charged in most West Coast ports for wharfage and handling. †Per 82-lb, net, reel. *Nominal.

Sizes O.D.	Wgt/Foot/Lb	Gulf Port	West Coast	Vancouver
Seamless A.P.I. Casing, Grade J-55:				
5½ in.	15.5	$1.47/ft	$1.51/ft	$1.32/ft
7 in.	23	2.10/ft	2.17/ft	1.90/ft
Seamless N-80 Casing:				
5½ in.	17	1.94/ft	2.00/ft	1.75/ft
7 in.	23	2.50/ft	2.70/ft	2.36/ft
Seamless J-55 Tubing:				
2⅜ in.	4.7	0.60/ft	0.63/ft	0.55/ft
2⅞ in.	6.5	0.80/ft	0.83/ft	0.73/ft

Sources of shipment: Western continental European (Schuman Plan) countries.

Prices on Imported Steel Rising

PRICES ON steel products imported from Europe have undergone further advances. In most cases quotations are purely nominal for the moment.

Various West European producers are not even quoting on shipments to this country. Their prices have reached the point where competition with domestic mills is difficult, and they can do better shipping what surplus they have to other areas of the world. Practically all European mills are experiencing brisk demand at home.

Their prospects for doing business here are further complicated by extended delivery promises. Deliveries on bars, structurals and wire rods extend several months.

Another handicap is the proposed increase of 10 per cent in ocean rates from Europe, effective Feb. 1.

Faces Competition—It is true, however, in other world markets there is competition from such low-cost countries as Japan on certain products. Actually, this is even reflected here. For instance, in Florida the import market on reinforcing bars is holding at about $5.20 per 100 lb. European sellers are quoting at about $5.50 base per 100 lb landed, duty paid.

Reflecting the extent to which European sellers are now losing out here is the increasing trend among jobbers, who have been handling imported steel, to turn to domestic mills for tonnage for the first time in months. Prices have advanced too sharply and deliveries are becoming too uncertain. This applies particularly to reinforcing and merchant bars and an assortment of angles and beams. Little or no sheet tonnage is being offered here by European mills.

Shipments of Steel Products—11 Months, 1954

(All grades: Carbon, alloy, stainless)
(Net Tons)

Products	Carbon	Alloy	Stainless	Total	11 Mos. 1953
Ingots	160,909	123,241	17,381	301,531	884,276
Blooms, etc.	1,034,465	297,522	12,947	1,344,934	2,469,326
Skelp	120,557	.....	.....	120,557	101,701
Wire rods	662,849	13,039	4,179	680,067	755,970
Shapes (heavy)	4,126,414	27,511	76	4,154,001	4,541,389
Steel piling	359,955	2	.....	359,957	306,124
Plates	4,706,395	197,425	15,794	4,919,614	7,033,775
Rails (standard)	1,077,441	112	.....	1,077,553	1,688,558
Rails (all other)	79,071	.....	.....	79,071	80,112
Joint bars	62,450	.....	.....	62,450	112,567
Tie plates	230,861	.....	.....	230,861	394,520
Track spikes	62,903	.....	.....	62,903	113,838
Wheels	177,732	1,313	.....	179,046	308,077
Axles	54,563	133	.....	54,696	145,223
Bars (hot-rolled)	4,367,364	1,238,198	31,095	5,636,657	8,737,351
Bars (reinforcing)	1,628,283	.....	.....	1,628,283	1,723,998
Bars (cold-drawn)	893,663	159,763	35,170	1,088,596	2,068,371
Tool steel	11,445	65,234	.....	76,679	108,083
Standard pipe	2,152,873	472	5	2,153,350	2,611,315
Oil-country goods	1,826,918	308,118	.....	2,135,036	1,823,697
Line pipe	2,524,421	16	.....	2,524,437	3,275,649
Mech. tubing	453,331	154,007	3,522	610,860	1,020,683
Pressure tubing	198,724	43,649	15,852	258,225	413,728
Wire (drawn)	2,157,331	28,409	17,840	2,203,580	2,655,525
Nails & staples	535,720	.....	8	535,728	500,532
Wire (barbed)	126,442	.....	.....	126,442	155,245
Woven wire fence	285,686	.....	.....	285,686	235,436
Bale ties	50,123	.....	.....	50,123	36,256
Black plate	628,805	.....	.....	628,805	699,708
Tin & terne plate	1,238,115	.....	.....	1,238,115	1,229,290
Tin plate (electro)	3,479,875	.....	.....	3,479,875	3,166,383
Sheets (hot-rolled)	5,255,607	174,359	12,756	5,442,722	7,223,365
Sheets (cold-rolled)	8,373,959	39,512	86,981	8,500,452	10,419,134
Sheets (galvanized)	2,156,280	791	.....	2,157,071	2,115,493
Sheets (other coated)	158,691	.....	.....	158,691	239,076
Sheets (enameling)	161,698	.....	.....	161,698	212,925
Elec. sheets-strip	82,213	454,189	.....	536,402	764,421
Strip (hot-rolled)	1,301,441	21,698	3,166	1,326,305	2,105,349
Strip (cold-rolled)	994,440	10,651	149,082	1,154,173	2,026,211
Total	53,969,613	3,359,364	405,834	57,725,231	74,502,680

Advertising Index

Abbey Etna Co. 123
Allegheny Ludlum Steel Corporation 11
Alliance Machine Co., The 92
Aluminum Company of America 17, 18, 19, 20
American Chain & Cable, Wire Rope Sling Department 10
American Hot-Dip Galvanizers Association 126
American Steel & Wire Division, United States Steel Corporation 115
American Wheelabrator & Equipment Corporation 28
Arces Corporation 116, 117
Armco Steel Corporation 34

Basic Refractories, Inc. 77
Bethlehem Steel Co. 1, 130
Bullard Co., The 32
By-Products Steel Co., A Division of Lukens Steel Co. 103

Carborundum Co., The 22, 23
Cattie, Joseph P., & Brothers, Inc. 122
Chemsteel Construction Co., Inc. 123
Cleveland Steel Tool Co., The 122
Cleveland Worm & Gear Co., The Inside Back Cover
Colorado Fuel & Iron Corporation, The, Wickwire Spencer Steel Division 65
Columbia-Geneva Steel Division, United States Steel Corporation 115
Conforming Matrix Corporation 63
Continental Foundry & Machine Co. 79, 80
Coolidge Corporation 59
Copperweld Steel Co., Ohio Seamless Tube Division 68
Copperweld Steel Co., Steel Division 55
Cowles Chemical Co. 119
Cutler-Hammer, Inc. Back Cover

Diamond Manufacturing Co. 122

Eastern Machine Screw Corporation, The 122
Electric Controller & Mfg. Co., The Inside Front Cover
Electric Equipment Co. 127

Florida, State of, Industrial Development Division 121
Frasse, Peter A., & Co., Inc. 3

Goodyear Tire & Rubber Co., Inc., The 4
Grip Nut Co. 58

Hofmann Industries, Inc. 127

Iron & Steel Products, Inc. 127

Jones & Laughlin Steel Corporation 87

Lehigh, Inc., Air Control Division 27
Lukens Steel Co., By-Products Steel Co. Division 103

McKay Machine Co., The 47
Metalwash Machinery Corporation 5

National-Standard Co., Reynolds Wire Division 112
National Steel Corporation 85
National Tube Division, United States Steel Corporation 115
North Carolina Department of Conservation & Development 12

Ohio Seamless Tube Division of Copperweld Steel Co. 68

Pawtucket Manufacturing Co. 6
Pope Machinery Corporation 114

Republic Steel Corporation 8, 9
Reynolds Wire Division, National-Standard Co. 112
Roebling's, John A., Sons Corporation, A Subsidiary of The Colorado Fuel & Iron Corporation 29
Ryerson, Joseph T., & Son, Inc. 36

Scioky Bros., Inc. 101
Service Steel 122
Simmons Machine Tool Corporation 27
SKF Industries, Inc. 2
Standard Oil Co. (Indiana) 24, 25
Standard Pressed Steel Co. 21

Tennessee Coal & Iron Division, United States Steel Corporation 115
Texas Co., The 30
Timken Roller Bearing Co., The, Steel & Tube Division 56
Tinnerman Products, Inc. 60
Toledo Stamping & Manufacturing Co. 122
Torrington Co., The 48

Ulbrich Stainless Steels 58
Union Wire Rope Corporation 133
United States Steel Corporation, Subsidiaries 115
United States Steel Export Co. 115
United States Steel Supply Division, United States Steel Corporation 115

Vorson Allsteel Press Co. 7

Washburn Wire Co. 26
Weirton Steel Co. 85
Westinghouse Electric Corporation, Sturtevant Division 33
Wickwire Spencer Steel Division of The Colorado Fuel & Iron Corporation 65

Youngstown Sheet & Tube Co., The 13

~ ~ ~

Table of Contents, Page 5

Classified Advertising, Page 127

Your best cancer insurance...

"LIFETIME" POLICY... See your doctor *every year* for a thorough check-up, no matter how well you feel.

"DAY-TO-DAY" POLICY ...See your doctor *immediately* at the first sign of any one of the seven danger signals that *may* mean cancer (1) Any sore that does not heal (2) A lump or thickening in the breast or elsewhere (3) Unusual bleeding or discharge (4) Any change in a wart or mole (5) Persistent indigestion or difficulty in swallowing (6) Persistent hoarseness or cough (7) Any change in normal bowel habits.

Many cancers can be cured, but only if properly treated *before* they have begun to spread or "colonize" in other parts of the body.

For *any* information about cancer just call the American Cancer Society or write to "Cancer" in care of your local Post Office.

American Cancer Society

Determining the Depth-Hardness of Alloy Steels

This is the eighth of a series of advertisements dealing with basic facts about alloy steels. Though much of the information is elementary, we believe it will be of interest to many in this field, including men of broad experience who may find it useful to review fundamentals from time to time.

The hardenability of an alloy steel is usually measured by the depth to which the steel will harden under specific conditions of heating and cooling. One of the most conclusive methods of determining depth hardness is the end-quench hardenability test (ASTM A255). In essence, this test is as follows:

A 1-in. round specimen, approximately 4 in. long, is heated uniformly to the proper quenching temperature. The specimen is removed from the furnace and placed in a bracket; then a jet of water at room temperature is played on the bottom face of the specimen without touching the sides. This water jet is kept active until the entire specimen has cooled. Longitudinal flat areas are ground on opposite sides of the piece, and Rockwell C readings are taken at 1/16-in. intervals. The resulting data are plotted on graph paper, with the Rockwell C values as ordinates and distances from the quenched end as abscissae.

Experiments have shown that the points on the hardenability curve approximate the cooling rates at the centers of quenched rounds of various sizes; and that the hardness values at the centers of these rounds will correspond very closely with those shown at points on the end-quench hardenability curve.

In general it may be said that when end-quench curves for different steels approximately coincide, these steels can be treated similarly for equivalent tensile properties in sections of the same size.

A study of hardenability curves reveals that depth-hardness depends upon the amount of carbon present, the alloy content, and the grain size. Manganese, chromium, and molybdenum are the chief elements that promote depth-hardness, while nickel and silicon help to a lesser degree. It should be noted, also, that phosphorus promotes depth-hardness, while sulphur has a negative effect. In normal low-phosphorus and low-sulphur steels, the two elements neutralize each other.

Hardenability curves, and the practical application of data they yield, are the subject of intensive study by Bethlehem metallurgists. These technicians will be very glad to discuss all phases of it with you, and to give whatever help you may need in the selection, treatment, and uses of any alloy steel. Always feel free to consult with them. And please remember, too, that Bethlehem can furnish all AISI standard analyses, as well as special-analysis steels and the full range of carbon grades.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

BETHLEHEM ALLOY STEELS

BETHLEHEM STEEL

Cleveland Type AH reducer, nine of which are installed at the Allen Mine. Cutaway shows the very heavy gear shaft, rugged shaft bearing mounting, and extra sturdy housing construction designed for heavy external loads.

Push-button car loading with CLEVELAND drives

ONE operator at a panel board in the tipple presses a button. That's the signal for Cleveland worm gear speed reducers to open the flop gates in three "pants" type coal loading chutes. When the operator presses a different button, the Cleveland drives respond accordingly and instantly to remote control. This is how Cleveland facilitate loading at the most up-to-date coal mine in the Far West—the Allen Mine of The Colorado Fuel and Iron Corporation, near Trinidad.

Cleveland worm gear speed reducers are ideally suited to push-button operations. Precision matching of case-hardened steel worms to nickel-bronze gears insures 100% dependability. The compact, right-angle Cleveland design saves space and makes installation easy.

You'll find Clevelands throughout the mining industry, above and below ground, so dependable and long-wearing they frequently outlast the machines they drive. Get full engineering data on the complete Cleveland line. Write today for your free copy of Catalog 400. The Cleveland Worm and Gear Company, 3270 East 80th Street, Cleveland 4, Ohio.

Affiliate: The Farval Corporation, Centralized Systems of Lubrication. In Canada: Peacock Brothers Limited.

CLEVELAND
Worm Gear
Speed Reducers

WHAT'S NEW IN MOTOR CONTROL? ★ ★ ★ GET IT FIRST IN CUTLER-HAMMER

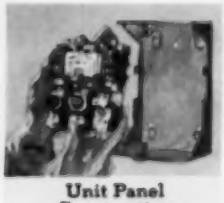
Now Cutler-Hammer ★★★ Motor Control in NEMA Size 2 for motors up to 25 HP*

It is here . . . Cutler-Hammer ★★★ Motor Control for your larger motors, NEMA Size 2 Starters with the famous three stars on the Cutler-Hammer nameplate. The three stars that stand for three entirely new standards in motor control performance and value. Star #1: Installs easier. So much easier that installation savings often exceed the cost of the control. Star #2: Works better. So much better that this control often pays for itself many times over in just the production interruptions it avoids. Star #3: Lasts longer. So much longer that this control *never* needs maintenance care or expense in 90% of its uses. If you are one of the many users who have proved these are facts, not mere claims, you will welcome the news that your larger motors can now have this same control. Order Bulletin 9586, Size 2, today from your nearby Cutler-Hammer Authorized Distributor. He is stocked and ready to serve you. CUTLER-HAMMER, Inc., 1211 St. Paul Ave., Milwaukee 1, Wisconsin.

CUTLER-HAMMER
★ ★ ★
MOTOR CONTROL
C-H

3-D Accessibility

Removing the wrap-around cover bares the entire starter for three-directional accessibility. It is wide open at front and both sides. You can see everything and reach anything. Wiring the starter is simplified and routine inspection is made so easy and complete nothing is ever neglected.



Unit Panel Construction

The entire starter mechanism can be removed from its case by simply loosening three screws. With mechanism out of the way, mounting case, connecting conduit and pulling wires is a cinch. A great time saver. No skinned knuckles. No damaged starter mechanisms.

Full Three-Phase Protection

Only three overload relays can provide positive three-phase protection to stop needless motor burn-outs and production interruptions. And only Cutler-Hammer offers three overload relays in *standard* starters without the excessive costs and delays of special starter constructions.

Adjustable Sensing Coils

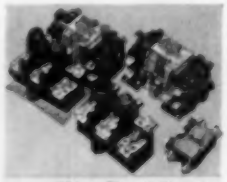
Only the accurate adjustment of overload protection permits motors to work harder without damage. How more important than ever with newer type small frame motors. Only C-H offers adjustable load sensing coils . . . for 3% loading accuracy instead of the 10% to 12% in all other controls.

Superlife Vertical Contacts

How the famous C-H dust-safe vertical contacts have been doubly improved. New light-weight design cuts bounce to reduce arcing. Also, arcing is now pressure-quenched. Contact maintenance care and costs are ended for all time in all normal motor control uses.

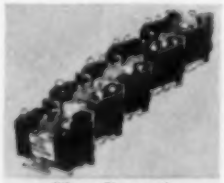
For Control Panel Designers

The new Cutler-Hammer ★★★ Motor Control offers an array of spectacular new features to provide many exclusive advantages in circuit planning, compact panel design, better motor protection and better control performance. Be sure you have complete design data on this advanced equipment. Write or wire today.



New Control Components

All parts of the new C-H ★★★ Starters in NEMA 0, 1 and 2 Sizes are available as components, also complete starters on convenient unit panels. Electrical interlocks are available to provide additional control circuits when desired.



New Control Relays

Finest of control relays. 10 and 15 Amp. 2-3-4-5-6 poles. All contacts instantly convertible from NO to NC or vice versa. NO or NC status seen at a glance without removing cover. New armored magnet coils color coded for voltage and frequency.

New SD & HD Pushbuttons

New standard duty pushbutton station with pilot light offers many exclusive features, typical of complete C-H line. Watch soon for announcement of the revolutionary new line of C-H heavy-duty all-tight one-hole mounting pushbuttons.